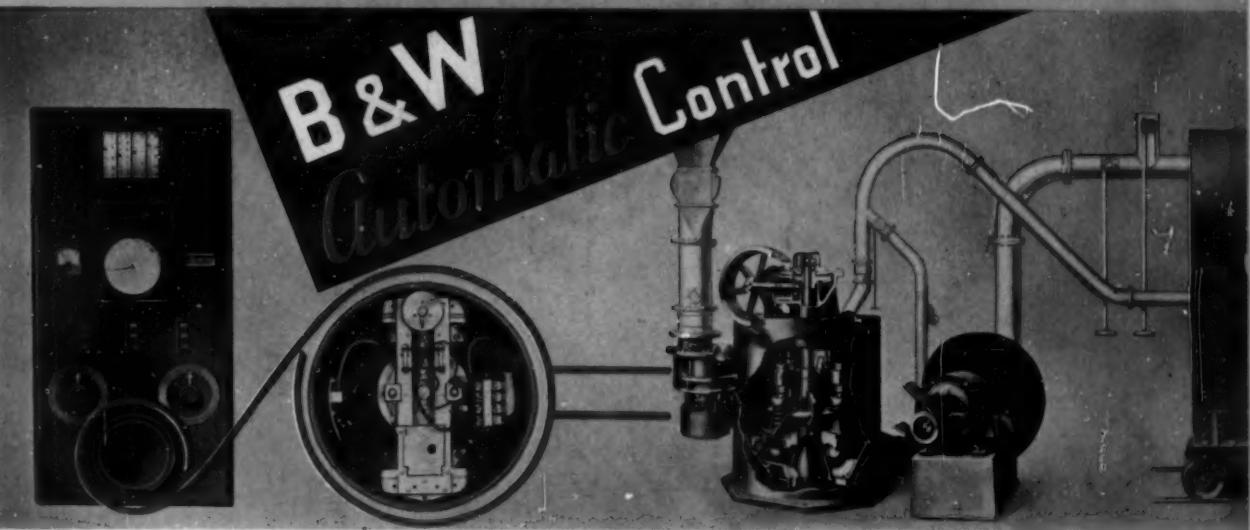


Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

FEBRUARY, 1938



Would you be satisfied with a car in which the proportion of air and fuel had to be regulated separately — by hand?

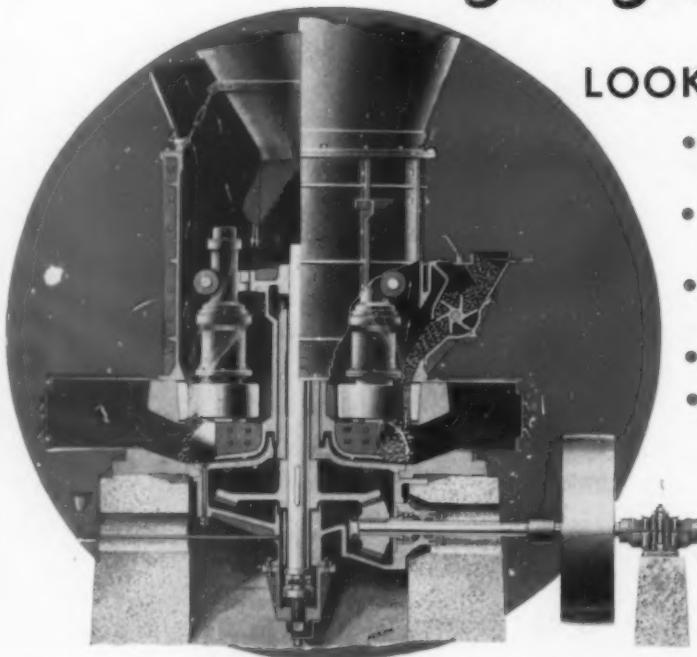
As VITAL
to Kiln Operation
as the Carburetor is to Motoring

B&W Automatic Control improves combustion, cuts coal consumption, and results in uniformly burned clinker. It proportions air and coal correctly, and from a one-point control responds immediately to meet changes in kiln requirements; in its settings for the size and moisture content of the raw coal. Write today for Bulletin C-10.

The Babcock & Wilcox Company, 85 Liberty St., New York

the WILLIAMS IMPROVED ROLLER MILL with AIR SEPARATION

For Fine Grinding —



LOOK AT THESE FEATURES

- Electric Steel Castings In Journals and Spider
- Abrasion Resistant Metals—Assure Long Life of Grinding Parts
- Grinding Parts Retain Original Shape Longer
- Low Power Consumption
- Rollers and Main Spindle Operate On Ball Bearings
- Big Door Provides Easy Entry to Mill
- Positive Automatic Feed Control
- More Efficient Air Separators
- Dry and Grind Simultaneously

Williams Improved Roller Mills with Air Separation are the most economical and practical for extremely fine grinding. Due to their large output on extremely fine work, it is now possible to produce a superior product at the same cost at which coarser grinds have been produced heretofore. Fineness is instantly changeable from 70% 100 mesh to 99.9% 325 mesh.

Williams offers the greatest advance in fine grinding machinery that the industry has seen in many years. Let us submit facts and figures on the proper size machine for your work.

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Sales Agencies in All Principal Cities Including

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Williams Roller Mill
with Super Separator



Williams

PATENT CRUSHERS GRINDERS SHREDDERS

The Rock Products Industries Everywhere use



LINK-BELT CONVEYORS AND TRANSMISSION EQUIPMENT



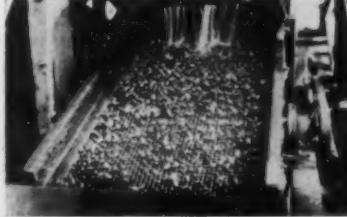
Rotoscoop for recovery of fine sand



Belt Conveyor handling sand



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Speed Reducer and Chain Drive operating conveyor

● Producers of sand, stone, lime, gravel, gypsum cement and other non-metallic minerals have long known through actual use that Link-Belt cost-reducing mechanical handling equipment and driving machinery are durable, dependable, and economical, being built to last, and to operate at maximum efficiency. Send for General Catalog No. 700.

Link-Belt Company, Chicago, Philadelphia, Indianapolis, Atlanta, San Francisco, Toronto, or any of our other offices located in principal cities.

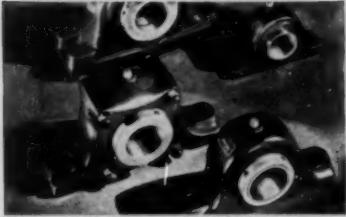
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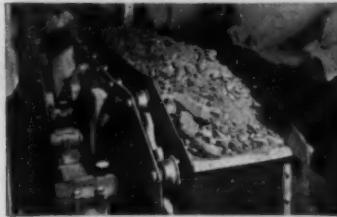
The Link-Belt Silverstreak Silent Chain Drive



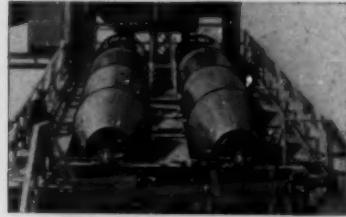
Self-Aligning Belt Conveyor Idler



Bearings, Collars, Hangers, Pulleys, Take-ups, etc.



Steel Apron Conveyor handling rock



Inclined Conical Screens

Rock Products

With which has been consolidated the journals

**CEMENT and ENGINEERING CONCRETE
NEWS PRODUCTS**

Founded 1898

Est. 1918

RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD

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of Known Value



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reader interest in terms of
paid circulation

Authentic facts relating to
editorial scope and reader-
ship analysis



A STROKE OF LIGHTNING IN A RUBBER HOSE

A typical example of Goodrich improvement in rubber

EVER see a man cleaning the rough spots off metal? He uses a blast of sand, roaring out of a hose nozzle at 85 miles per hour. Efficient for cleaning, but the tiny sand particles built up hundreds of thousands of volts of static electricity in the hose and caused a spark between lining and cover of the hose (actually a tiny stroke of lightning) which punctured the hose, let air pressure escape, ruined the entire length, and often knocked the worker down.

Goodrich engineers set out to overcome this danger and waste. A grounded wire would do it, but a wire

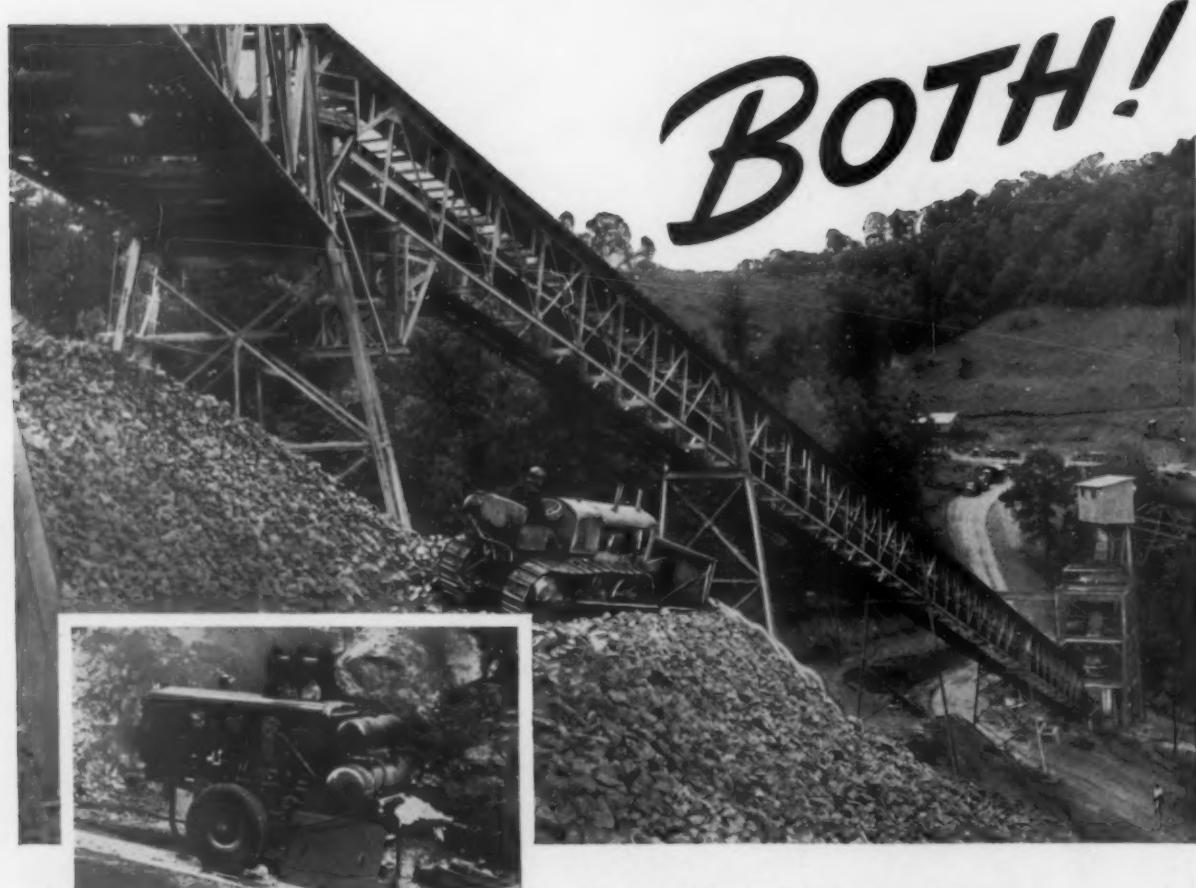
inside the hose was worn out by the blast of sand, wire outside still allowed the destructive spark. Finally Goodrich developed a hose construction with a wire spiraled between the all-rubber hose lining and the outer rubber-and-fabric wall. The spark jumps to the wire through the rubber, but the resilient rubber seals the hole and no damage is done—the spark never penetrates the hose wall. Workmen are no longer knocked down, efficient hose life is multiplied, cost to the user goes down.

This safer, longer-lived product is a typical example of Goodrich research

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Plus the Most Efficient, Low Cost Mechanism Yet Developed for Transit Mixing and Delivery . .

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603 Dublin Avenue

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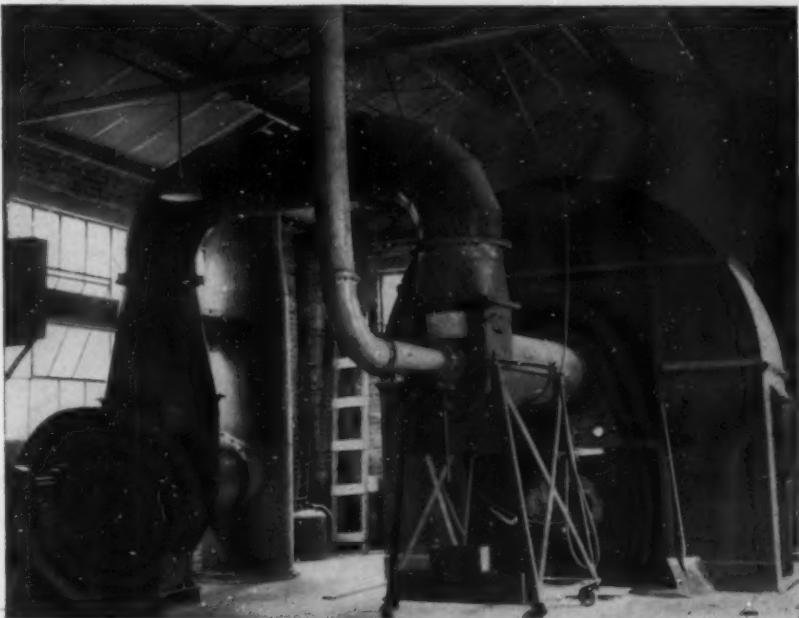
There's a Timken Rock Bit Distributor at the other end of your telephone—write for his name and address.

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Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

TIMKEN
ROCK BITS

TRAYLOR-CHEEESMAN KILN — COOLER — BURNER SYSTEM —



*ready to
pile up
profits
for
you*

WE BUILD:

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- Rotary Dryers
- Rotary Slakers
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- Evaporators
- Jaw Crushers
- Gyratory Crushers
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In lime and cement manufacture, in chemical plants and process industries—in fact in any location where rotary kilns and coolers are employed, the use of The Taylor-Cheesman Kiln-Cooler-Burner System will effect increased efficiency, marked economy and greater production of better product.

With this system, all of the heat of clinker or other hot calcined materials, is recovered from the Cooler, to at least within 100° of atmosphere, and all of these gases are used by the Burner as preheated (to about

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The kiln, cooler and burner system is furnished complete by us, or any existing system may be revamped to secure the advantages of the principles involved. Our technician will consult with you gladly, whenever you say! At least, send for our Bulletin 116, which you will find most interesting and instructive.

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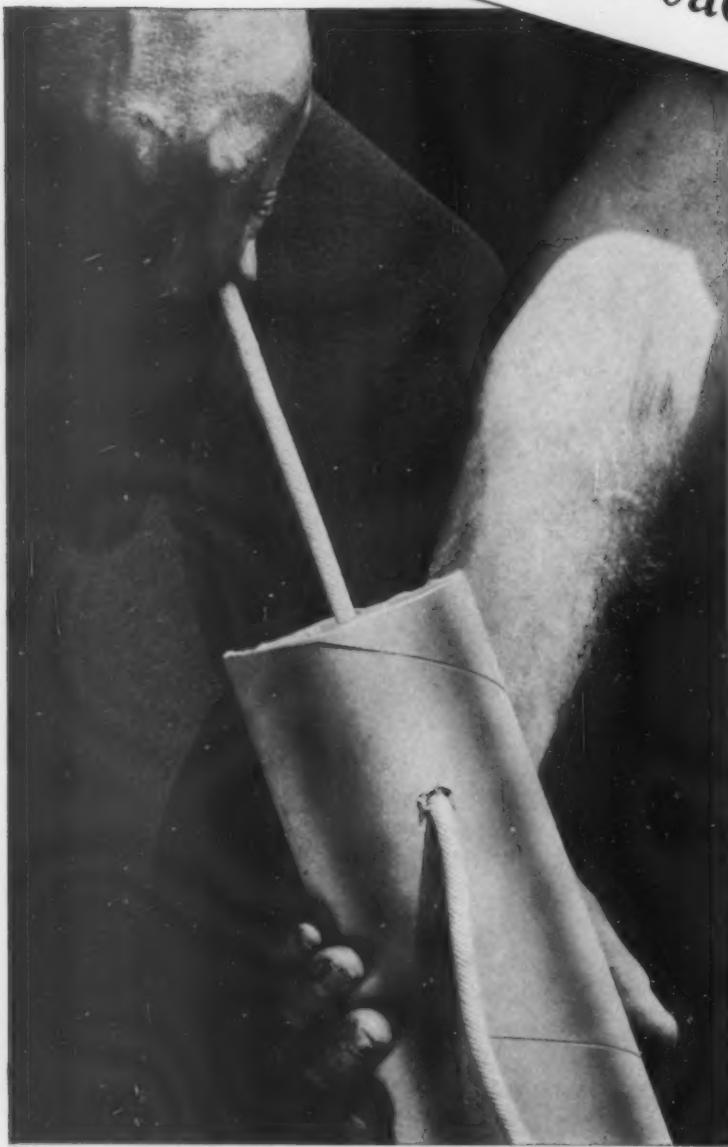
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CORDEAU-BICKFORD
detonates each cartridge



CB69

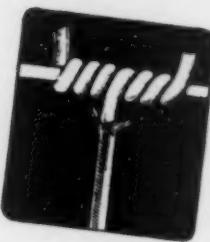
THE ENSIGN-BICKFORD COMPANY • SIMSBURY • CONN.



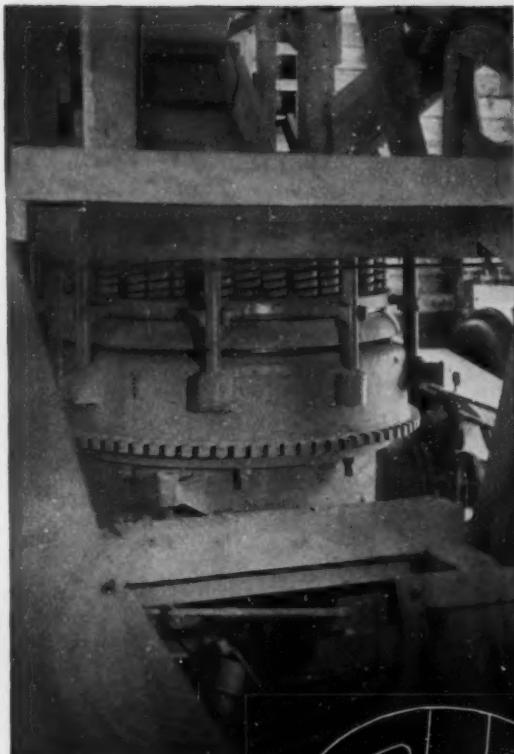
EASY as lacing a boot
... the line of Cordeau
is threaded through
the first cartridge,
which is then lowered to the bot-
tom of the hole. Other cartridges
are loaded into the hole, each
being in contact with the line of
Cordeau extending up the side.

Thus Cordeau-Bickford, the
insensitive detonating fuse, de-
tonates *each* and *every* cartridge in
the hole. This results in more
power from your explosives, for
the entire charge "goes" with the
added force of a primer cartridge.

There are many money-saving
advantages in the use of Cordeau-
Bickford—explained in the Cor-
deau Book, which is free.



CORDEAU-BICKFORD *Detonating Fuse*

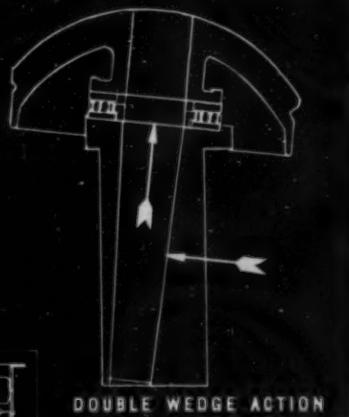


This 48 in. Telsmith Gyrasphere Crusher crushes ore to minus $\frac{1}{8}$ in. in the custom mill of the Cripple Creek Mining and Milling Co., Cripple Creek, Colorado.



CHOKE FEED

Double protectors . . . four flexible leather labyrinth seals plus two piston rings . . . reduce both oil consumption and maintenance expense to a minimum never attained in any other crusher.



The Gyrasphere takes an unregulated and unlimited choke feed. That means, steady, reliable, economical, effective reduction capacity.



PISTON RING SEALS

The Only
**SECONDARY CRUSHER
 WITH THE
Double Wedge
 CRUSHING ACTION**

Working at choke feed, the Telsmith Gyrasphere Crusher not only turns out an enormous tonnage of more cubical aggregate, but crushes finer, with less trouble, less power, and less upkeep.

In the Gyrasphere, two forces cooperate to produce the most effective breaking action ever developed in any crushing device. The head is impelled both by the gyrated shaft and a rotary wedge action, produced by the supporting eccentric and roller thrust bearing. The bronze eccentric sleeves are relieved of most of the load—pressures being diverted downward to the massive roller thrust bearings which wear evenly and last indefinitely.

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MODERN READY MIX EQUIPMENT

*fights your battle
for 1938 profits*



More Efficient
CENTRAL MIXING

Complete
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★ A Blaw-Knox engineer will lay out a new and economical ready mixed concrete plant for you, or, he will tell you what is necessary to modernize your present plant for profitable operation—either through rearrangement of your present equipment or the addition of new Blaw-Knox Bins, Batchers, Truck-mixers or Agitators.

★ Only Blaw-Knox can offer this complete service—it is available to you without obligation.

★ Phone, wire or write.

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OF BLAW-KNOX COMPANY

2035 Farmers Bank Bldg., Pittsburgh, Pa.

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15 "Western" 36-yard Cars for AMERICA'S LARGEST LIMESTONE QUARRY



THE MICHIGAN LIMESTONE AND CHEMICAL COMPANY EFFECT NEW OPERATING ECONOMIES THROUGH SAVINGS IN WEIGHT—IMPROVED DESIGN

EXTRA STRENGTH... due to weight saving tough alloy steels... give these new 36-yard water level cars the highest ratio of pay load to dead weight. With unlimited clearance due to drop door construction the largest pieces or chunks are easily dumped to either side, the doors acting as aprons to deposit the materials well away from the track.

"Western" side dump cars use less air than all other makes because their superior design requires less lifting effort. The simplicity of the large diameter single stroke cylinders assure long life at practically no maintenance expense.

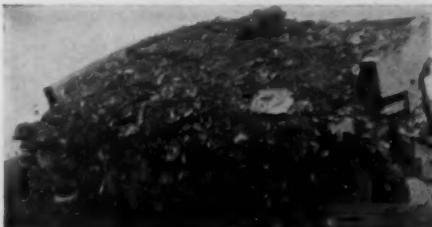
The 50° dumping angle, the seamless floor and smooth discharge surfaces assure fast, complete dumping of any type mine or quarry material. They comply with the latest American Association of Railroads, and Interstate Commerce Commission recommended car practices, and are acceptable for interchange revenue service under load.

Austin-Western are leaders in the development of on and off track haulage equipment. More than 60 years of successful experience in designing and building this type of machinery have qualified us to supply your requirements exactly. Ask us to figure your haulage requirements.

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1844 Barrows Street, Aurora, Ill. Cable Address AWCO, Aurora, U.S.A.



These new cars have a welded bed underframe with a continuous steel floor plate welded to the bed underframe.



Rubber tired semi-trailers for motor truck haulage. A-W light weight heavy duty pneumatic tired trail cars have proved their economy in open pit mines throughout the country—used with truck tractors and track type crawler tractors, end, bottom, or two-way side dump.

Austin-Western

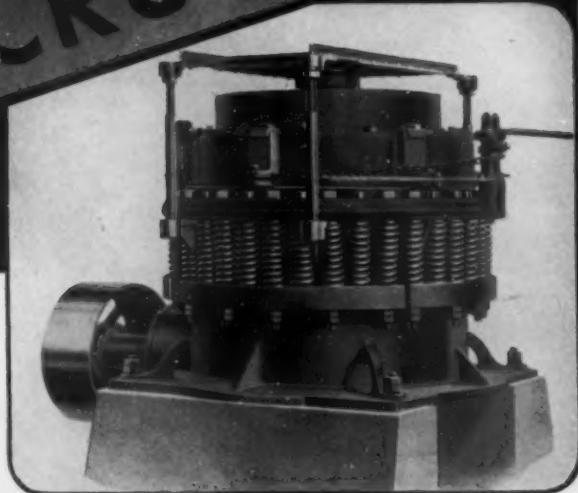


Pacific Rock & Gravel Co.
Monrovia, Cal.
Four foot Symons Standard
Cone Crusher

SYMONS CRUSHERS

**For the West Coast's
leading producers of
stone and gravel . . .**

Like so many of the prominent producers of crushed materials on the West Coast, the Pacific Rock & Gravel Company uses a Symons Cone for its reduction crushing. Here is another instance where a Symons Crusher has established an unusual performance record. The great capacity of fine product of the Symons Cone combined with low maintenance expense are factors which have made this plant outstanding because of its low crushing cost. In meeting today's demands for better materials, this modern plant with its modern equipment is typical of the successful plants in the crushed materials industry.



Symons Cones are available in two types: the Standard for ordinary reduction crushing and the Short Head for an extremely fine product. The wide range of sizes permits the selection of the correct crusher for plants large and small. Write us concerning your reduction crushing problems.

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Subway Term. Bldg.

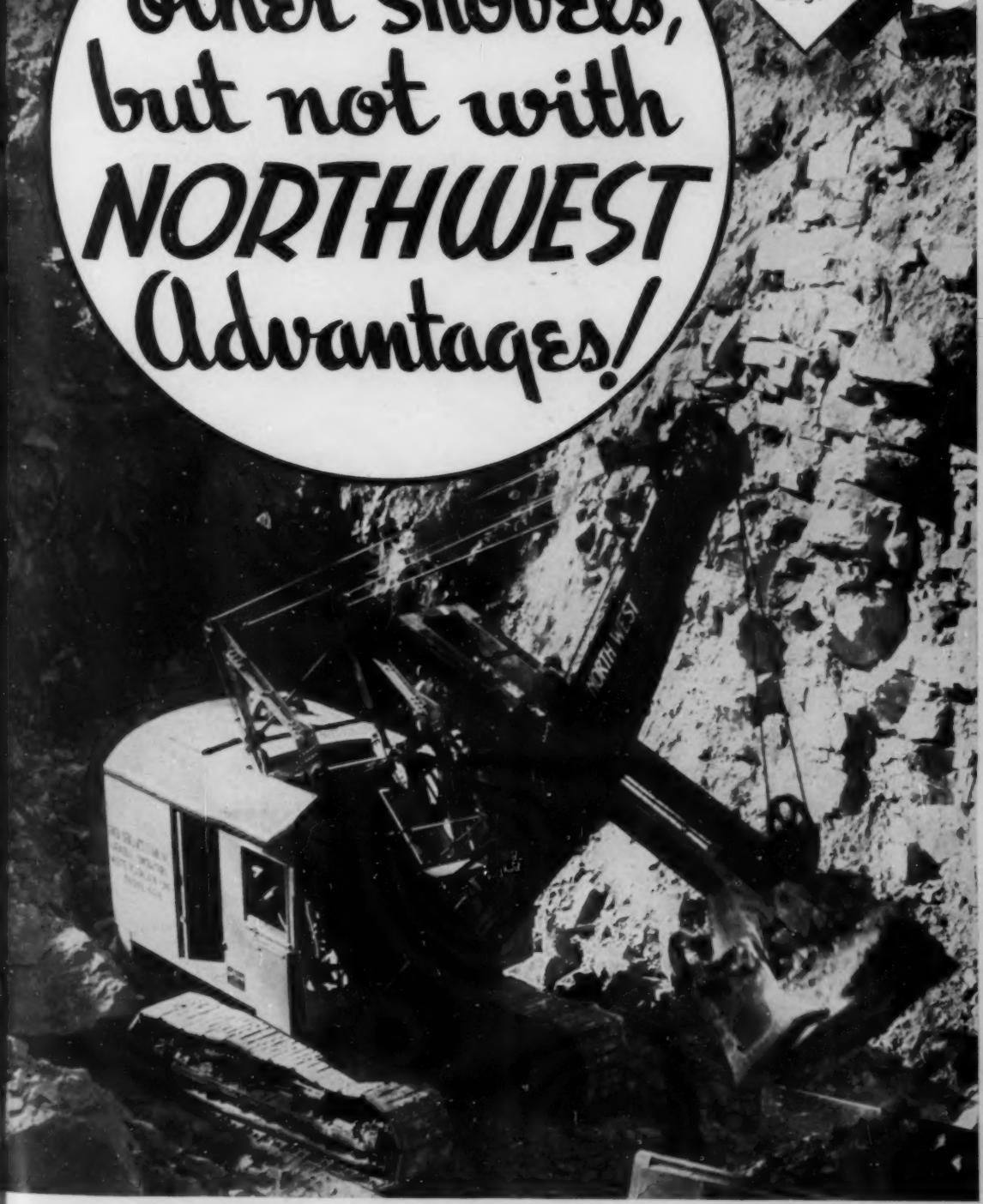
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Concourse Bldg.

LONDON, ENG.
Bush House

YES!
There are
other shovels,
but not with
NORTHWEST
Advantages!

GASOLINE
• ELECTRIC
• DIESEL
• OIL

Built
in a range
of 18 SIZES
3/8 yd. capacity
and
Larger



The Cushion
Clutch.

The "feather-
touch" Clutch
Control.

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shafting.

Uniform pres-
sure, swing
clutches.

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power, Inde-
pendent Crowd.

Welded shovel
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dipper sticks.

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bearings on all
high speed
shafts.

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Drive.

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tread and roller
design.

Worm boom
hoist.

Simplicity of
design for ease
of upkeep.

Total

INCREASED
PROFIT
PER CU. YD.
OF OUTPUT

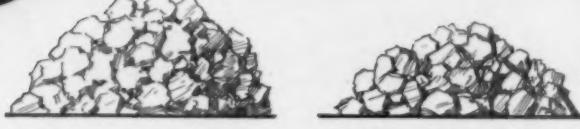
NORTHWEST ENGINEERING CO., 1820 Steger Bldg., 28 E. Jackson Blvd., Chicago, Ill.

NORTHWEST

If your shovel could talk



GOOD BLASTING HELPS ME MAKE GOOD



Well Blasted Rock
56.4 cu. yd. per hour

Poorly Blasted Rock
44.3 cu. yd. per hour

Rock well blasted moved almost as fast as common excavation! Time studies on 186,532 cu. yd. show:

Common excavation . . .	59.2
Well blasted rock . . .	56.4
cu. yd. per hour	

Poorly blasted rock was handled at only 44.3 cu. yd. per hour in 1 yd. buckets—21% slower than well blasted rock—a reduction of more than 100 cu. yd. per day per shovel.

ATLAS Blasting is *Good* Blasting

Atlas explosives and Atlas methods will help your shovel *make good*—and help you make a good profit!

A time study on more than 400,000 cubic yards of rock proves that good blasting pays. And—that the man who is penalized by poor blasting *pays—and pays—and pays!*

Then—consider the extra profits and the extra savings *you* might be making. And—determine to make them with Atlas Apex!

ATLAS APEX develops a spreading, stressing action, distributing its controlled

force throughout the burden. Atlas Apex gives better fragmentation, reduces secondary blasting—and allows increased spacing. Made in five grades—each with three velocities—it meets a wide variety of blasting conditions.

Let the Atlas representative arrange an Apex demonstration in *your* quarry!

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ATLAS

E X P L O S I V E S



We lubricate EACH WIRE TO INSURE LONG LIFE



LUBRICATION at each point of contact in wire rope is of equal importance to that in any complicated machine*. It reduces external wear, prevents corrosion, cuts down internal friction and enables each strand to move freely—all of which results in increased useful life.

Every wire of American Tiger Brand Wire Rope is carefully lubri-

cated. This adds vitally to the flexibility of the rope, enabling it to withstand the terrific jerks of starting and stopping.

This lubrication is the result of years of engineering and field experience and is but one of the many different features which make American Tiger Brand Wire Rope a profitable operating investment for you.



American Tiger Brand Wire Rope
Electrical Wires & Cables
Amerclad All-Rubber Cables
Aerial Tramways
Tiger Wire Rope Slings
Tiger Wire Rope Clips

American Tiger Brand Wire Rope is available in either Standard (non-preformed) or Excellay (preformed) constructions.

* Machine? Absolutely, wire rope is a machine. It fits perfectly the dictionary definition, "Any combination of mechanism for utilizing or applying power."

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

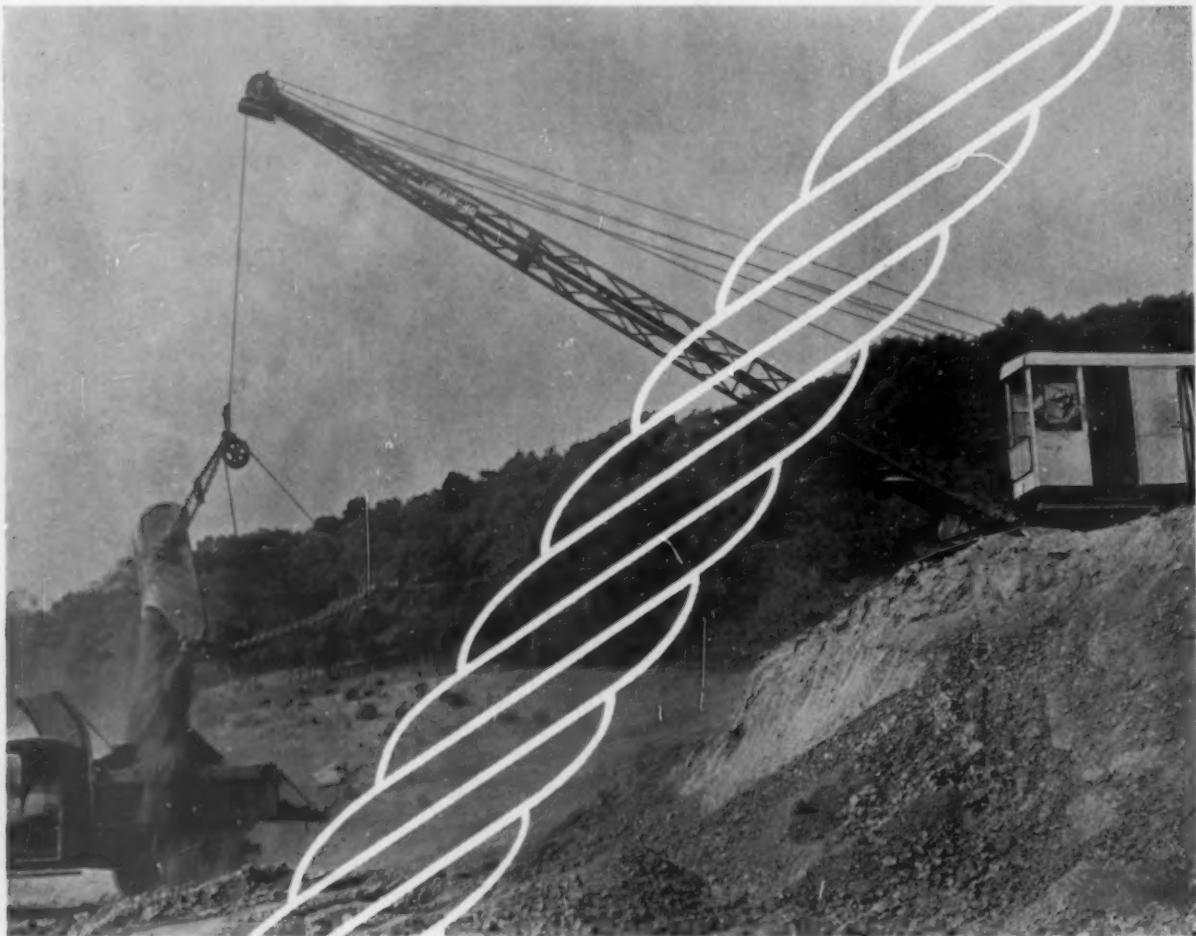
COLUMBIA STEEL COMPANY
Russ Building, San Francisco

United States Steel Products Company, New York, Export Distributors



UNITED STATES STEEL

It's KNOW HOW that counts



in Wire Rope

And there's plenty of "know how" back of Bethlehem Wire Rope—the accumulated experience of half a century of wire-rope manufacture by the Williamsport Wire Rope Company, recently acquired by Bethlehem. Take Drag Line on a boom machine, for example. Highest-strength steel is always specified. 6x19 lang-lay construction is universally used. Yet, even with these two points standardized among all rope makers, Bethlehem Drag Line has won high favor among contractors.

"Know how" enables Bethlehem to build a perfected drag line—having definite features, unique in Bethlehem ropes, which combat abrasive wear and resist the whipping action of casting. For one thing, the strands, whether Form-Set (preformed) or standard,

are "back turned." As wire is twisted into strand, the individual wires themselves are given a slight twist, making them hug together. Likewise, as the strands are twisted into rope, the individual strands are twisted slightly making a tight, solid surface to the line . . . a surface that has greater resistance to abrasion. This same "back turning" of the wires and strands balances internal stresses of the rope and makes it less kinky, less likely to bird-cage, easier to handle.

A small point, perhaps. Yet any contractor familiar with Bethlehem (formerly Williamsport) Rope can immediately tell the difference. Bethlehem rope casts better. It won't twist when let loose. It wears longer.

Whether its Purple-Strand Perfected Drag Line, Purple-Strand Form-Set Hoist Line, or wire rope for some other use, you'll find this "know how" invariably present in Bethlehem Lines.

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In the big rock cuts, on steep grades and large end-dump fills, Koehring Dumptors are moving and dumping rock and dirt at exceptionally low operating and maintenance costs. Hauling problems are solved with a profit when Dumptors are on the job. See this unit on the job and include it in your next dirt and rock hauling estimate.



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and you need Universals because they insure the greatest profits — they're designed to provide greater tonnage with less maintenance and less power consumption.

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Universal engineers are frequently called upon to design special plants. Having introduced the original overhead eccentric jaw crusher and with 32 years of field study to serve as a guide, they are qualified to design special equipment which, like Universal's standard units, provides greater production at the lowest possible cost.

Whether it's a standard or a special crushing plant you need, be sure and get a Universal. Remember, features can be imitated but years of experience can not be copied.

Write for Catalog No. 134-A on Universal Plants or submit your crushing, screening, loading or storage problem to us—we'll find the most practical and inexpensive way to do it for you—as we have for others.

Universal Plants and Crushers are sold by leading equipment dealers everywhere.

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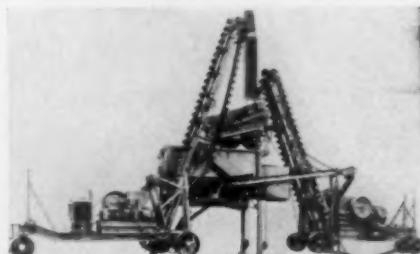
Cedar Rapids, Iowa



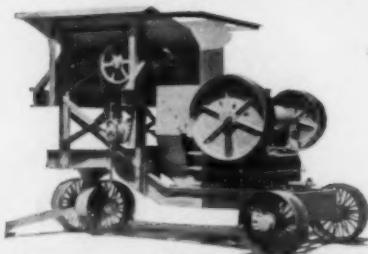
Universal High Capacity Semi-Portable Plant with Jaw and Roll Crusher Combination.



The Universal 8-80—a completely portable plant that "has everything."



This high capacity combination Roll and Jaw Crusher plant provides for low cost flexible operation.



Specially designed Universal Unit with Crusher fed by Apron Feeder.

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as in
WIRE
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**Some Steel is made to
CARRY**

as in
STEEL
STRUCTURES

**Some Steel is made to
RESIST WEAR**

as in
BUCKET
TEETH

**Some Steel
is made to
cut rock
as in
JACKBITS**

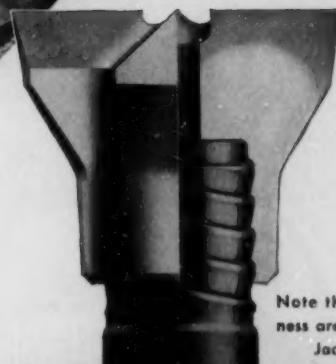
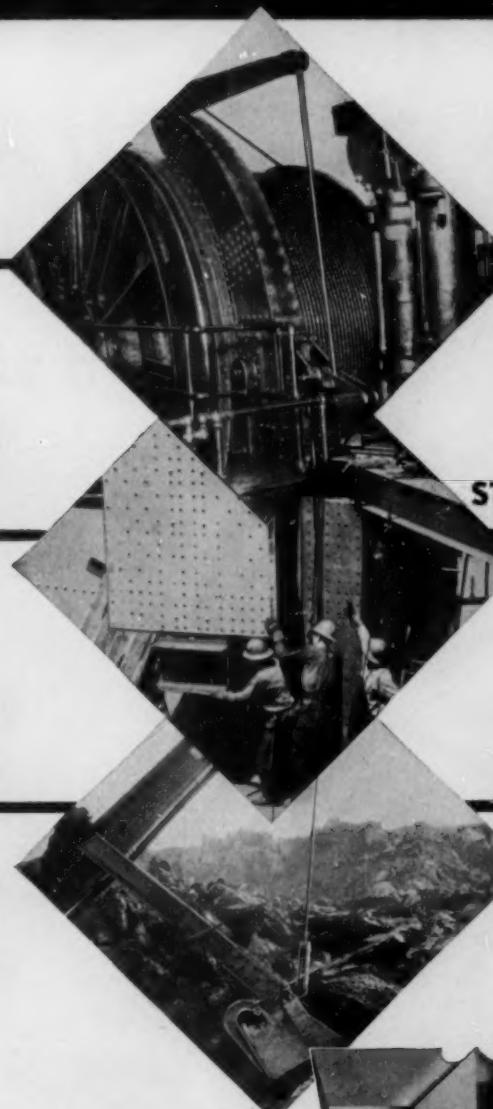
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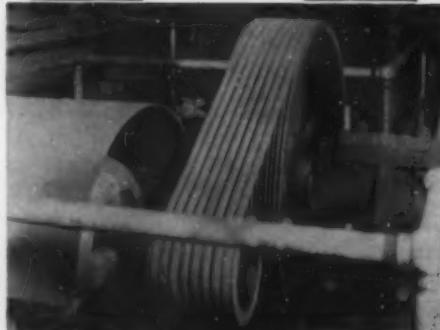
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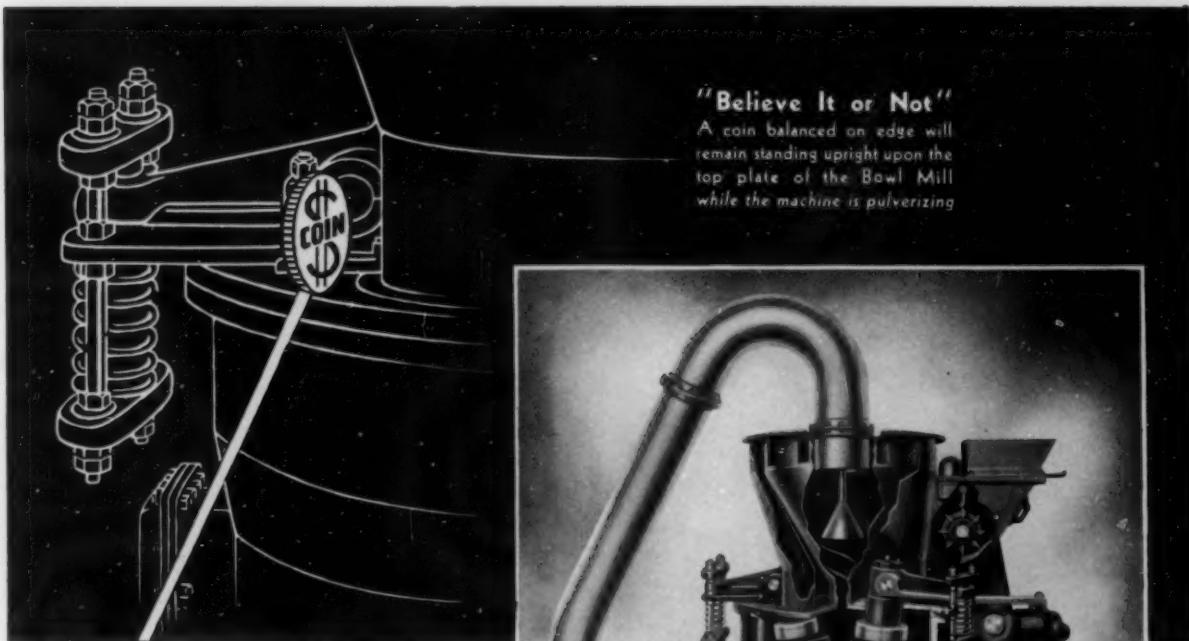
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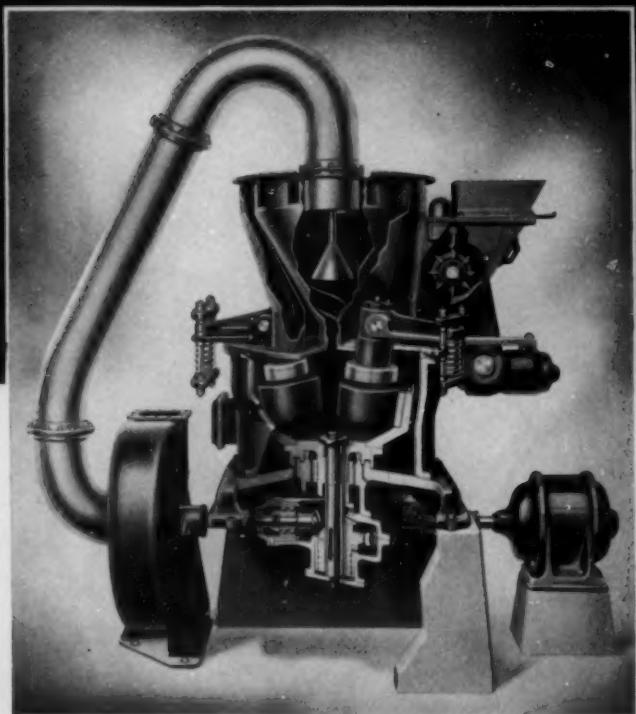
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"I saw an advertisement run by The Associated Business Papers that pictured me as typical of the prospects that advertisers' salesmen classify as 'tough guys.' The ad went on to say that while I am tough when salesmen call, I am pretty regular when I am reading an A.B.P. publication. Well, I don't resent it a bit. With so many keen salesmen calling on me every day, I have to pretend to be hard-boiled.

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WHY MORE QUARRIES ARE USING MORE NITRAMON*

22,000 POUNDS OF

NITRAMON

LOADED IN MY TUNNEL SHOT
IN 2½ HOURS! **NOT BAD!!**

AND LOOK AT THAT
FRAGMENTATION! WE WON'T
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BLASTING AFTER THAT SHOT!



THE USE OF NITRAMON is steadily increasing, because shot after shot proves to quarry owners and superintendents that NITRAMON gives lower cost per ton of rock moved. It gives finer fragmentation, assures less secondary blasting and is easy to load. Non-freezing. Packed in waterproof cans.



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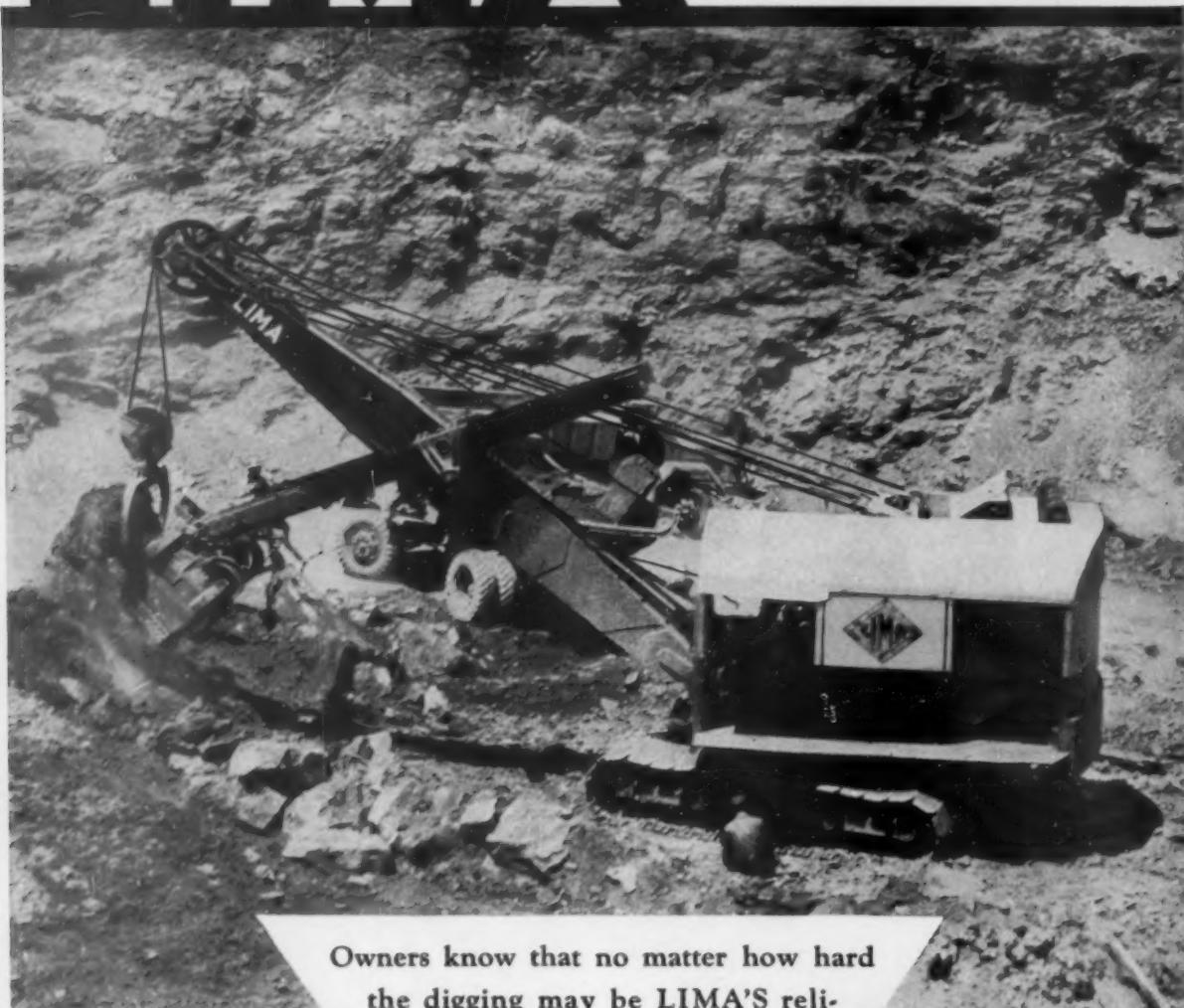
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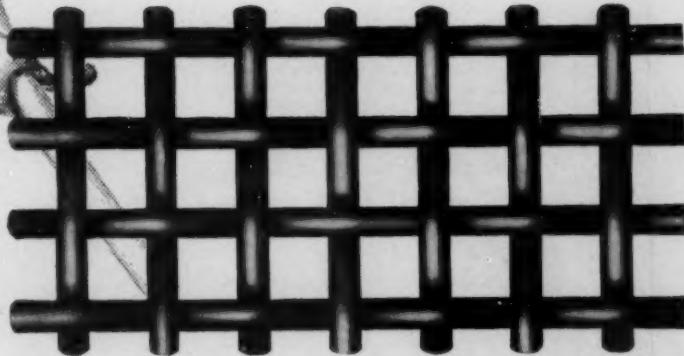
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DOES your screening fail in the "prime of life"...or does it go on to a ripe old age?

The life span of wire screening is based solely on the inherent toughness and stamina of the wire itself.

Wire making for the tough jobs...to meet exceptionally severe strength, vibration and abrasion requirements...has been Roebling's task for over 90 years.

If screen life extension is your problem, we offer you the benefit of this wire making knowledge, backed by a half century's experience in wire fabrication.

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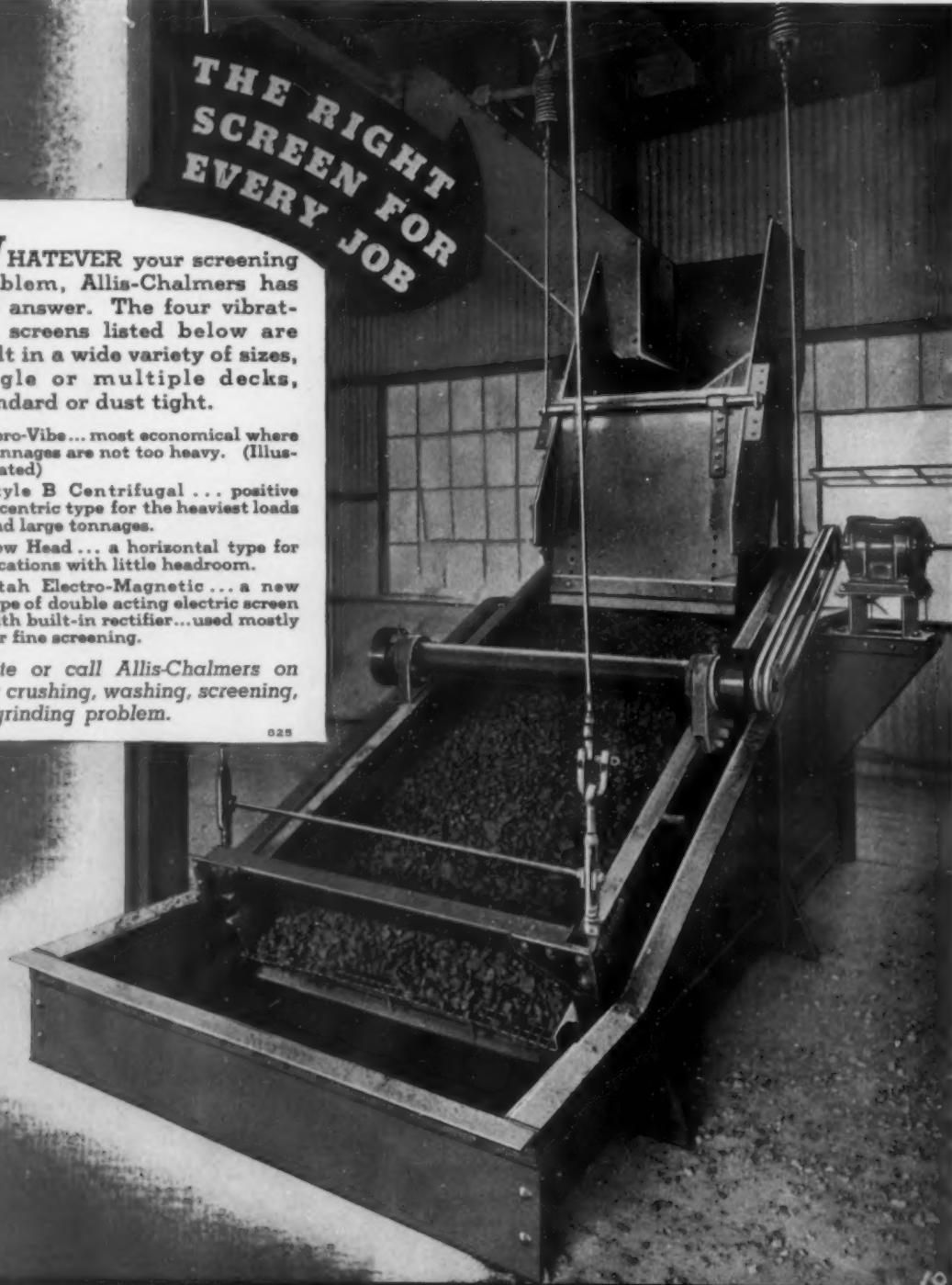
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WHATEVER your screening problem, Allis-Chalmers has the answer. The four vibrating screens listed below are built in a wide variety of sizes, single or multiple decks, standard or dust tight.

- * Aero-Vibe... most economical where tonnages are not too heavy. (Illustrated)
- * Style B Centrifugal ... positive eccentric type for the heaviest loads and large tonnages.
- * Low Head ... a horizontal type for locations with little headroom.
- * Utah Electro-Magnetic ... a new type of double acting electric screen with built-in rectifier...used mostly for fine screening.

Write or call Allis-Chalmers on any crushing, washing, screening, or grinding problem.

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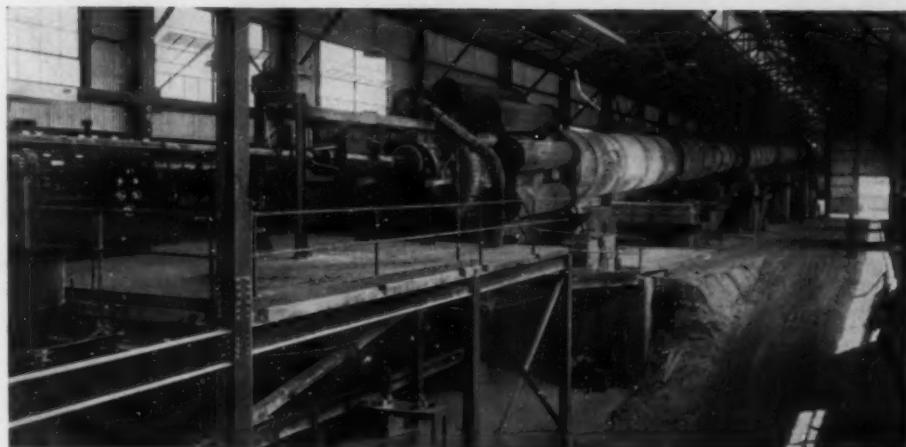
EQUIPMENT ENGINEERS TO INDUSTRY

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MILWAUKEE WISCONSIN

UNAX ROTARY KILNS FOR LIME BURNING



The advantages of the Unax Rotary Kiln are:

Low fuel consumption.
Reduced cost of production.

Better quality and greater uniformity of product.

• The Kiln illustrated is installed in the lime plant of H. E. Millard, Annville, Penna.

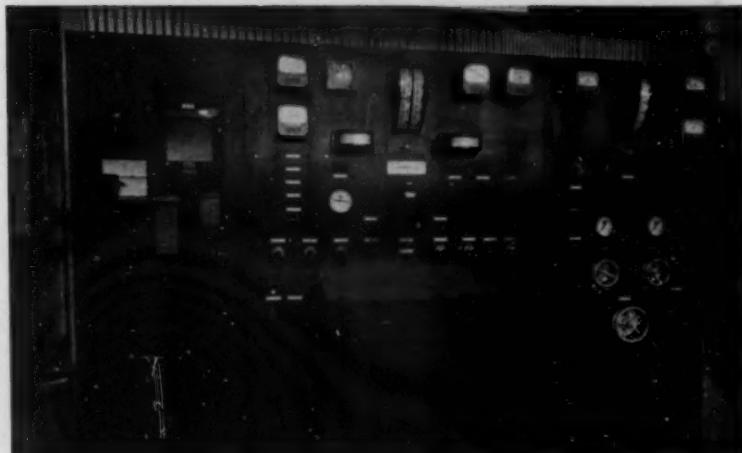
THE modern, efficient Unax Rotary Kiln for calcining lime is the result of our many years experience in manufacturing and engineering hundreds of rotary kilns in such industries as cement, ore, lime, chemical, etc.

The Unax Cooler is integral with the kiln and provides efficient cooling of the calcined material by means of the air for combustion which thereby becomes pre-heated to a high degree.

The FLS Centralized Kiln Control concentrates at one convenient point the control switches of the kiln and auxiliary equipment, sequence interlocks, alarms, signals, and instruments showing speeds, draft temperatures, etc., constantly presenting to the kiln operator a clear, quick picture of the kiln's operation.

The FLS Gas Analyzer permits obtaining complete combustion of the fuel while avoiding excess air in the kiln.

F. L. Smidth & Co. are manufacturers of Rotary Kilns, Coolers, Grinding Machinery and auxiliary apparatus, and in addition are Engineer Specialists in designing and equipping plants employing such machinery.



F. L. SMIDTH & CO.

225 BROADWAY

Engineers

NEW YORK, N. Y.



THE fact that this company, a big gold-mining property on the Pacific Coast, has selected G-E tellurium-rubber cable for its dredge No. 5 testifies to the ability of this cable to stand up under such severe service. The cable shown in the pictures is a shielded-type (Type SH), 3,000 volts, three-conductor, 350,000 cir mils, 1200 feet long.

Ideal for Service

This cable is flexible and does not readily kink; it is light in weight and small in diameter. It has a smooth surface and is little likely to pick up weeds, trash, dirt, or other foreign material. All these features save time in moving the dredge or shovel.

The tellurium-rubber jacket is tough and capable of resisting much abrasion and has long-aging qualities.

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The constant increase in size of electric shovels and dredges has made the task of selecting a type of trailing cable difficult. Voltage, loading cycles, heating, regulation,



protection to workmen, economics—all these factors must be taken into account.

You profit most when the cable is right for each job. To this end, make full use of the services of a G-E cable specialist and get the most for your cable dollar.

He can help in the selection of the *right* type—for long-term economy. Address nearest G-E sales office or General Electric Company, Dept. 6-201, Schenectady, New York.

**ALWAYS THE RIGHT
TYPE FOR EACH JOB**

GENERAL  ELECTRIC

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ROCK PRODUCTS

your best bet!

CALCIUM CHLORIDE STABILIZED MIXTURE

The production of ready-mixed stabilized road material is the aggregate producer's best bet for added profits in 1938 and the years to come.

In awarding contracts for 185 miles of stabilized roads to be constructed this spring, the Michigan State Highway Department stipulated that all of the 232,709 cubic yards of stabilized material required must be *plant-mixed*. To fill their 1938 maintenance requirements, Michigan contracted for an additional 302,560 cubic yards of *plant-mixed* calcium chloride stabilized mixture. The demand for plant-mixed material is strong, too, in Illinois, Indiana, Minnesota, Ohio, and is increasing rapidly in other states.

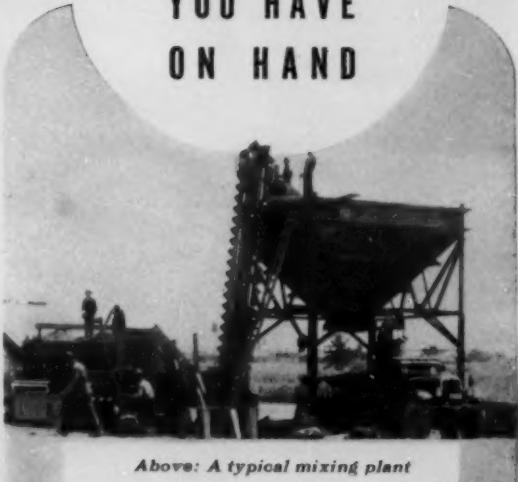
Here's a market to your liking — a profitable market that you can cut into on short notice. Most pit and quarry owners have the greater part of necessary equipment on hand. Many have waste heaps of pit over-burden and washed-out sand, silt and clay which they can turn back into profit by mixing in proper proportions with graded aggregates.

Your state, county, township and city officials will tell you they want ready-mixed calcium chloride stabilized road materials. Ask them. Then get into the business now, this spring, and reap the profitable rewards in supplying this road necessity. Any of the firms listed below will gladly furnish free information and advise you the easiest way to take advantage of this opportunity.

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The Dow Chemical Company • Midland, Michigan
Michigan Alkali Co. • 60 E. 42nd St., New York City
Soivay Sales Corp. • 40 Rector St., New York City

Utilizes
THE MATERIALS
YOU HAVE
ON HAND



Above: A typical mixing plant



Below: Delivering stabilized mix on roadway

CALCIUM CHLORIDE

FOR STABILIZING ROAD SURFACES

MADE TO STAND THE TOUGHEST GRIND



IN GOES the bar of red-hot Carnegie-Illinois steel . . . wham! . . . and out roll the perfectly forged grinding balls — all ready for heat-treatment and testing.

BEFORE USS Lorain Grinding Balls leave our plant we know that they are ready to give uniform service in the "daily grind" of your mills. This assurance is based on more than quality of materials, workmanship and processes. We plus that with careful forging and a precise system of heat control which results in just the right degree of hardness to withstand the heavy abrasion and terrific pounding of cascade action.

To maintain this standard, USS Lorain Grinding Balls are subjected to routine laboratory tests. From each production, sample grinding balls are given the Brinell test to make certain of surface hardness, and the Rockwell test to check hardness through the diameter of the ball. In this way we make sure that the gradation of hardness from the surface to the center is correct for maximum resiliency and wear.

USS Lorain Grinding Balls are made uniformly to meet your grinding needs. They are available in the following sizes: $\frac{3}{8}$ ", $\frac{5}{16}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ ", 1", $1\frac{1}{4}$ ", $1\frac{1}{2}$ ", 2", $2\frac{1}{2}$ ", 3", $3\frac{1}{2}$ ", 4", $4\frac{1}{2}$ " and 5".

OTHER LORAIN PRODUCTS

Mill Liners and Screens of High Carbon Rolled Plate, Manganese, Chrome Nickel, Chrome Nickel Molybdenum, and plain Carbon Steel or Hard Iron; Hammers for Swing Hammer Mills, Industrial Cars, and Trackwork.

U·S·S LORAIN GRINDING BALLS

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UNITED STATES STEEL



HERE'S A Shovel TO FIT RIGHT INTO YOUR PICTURE

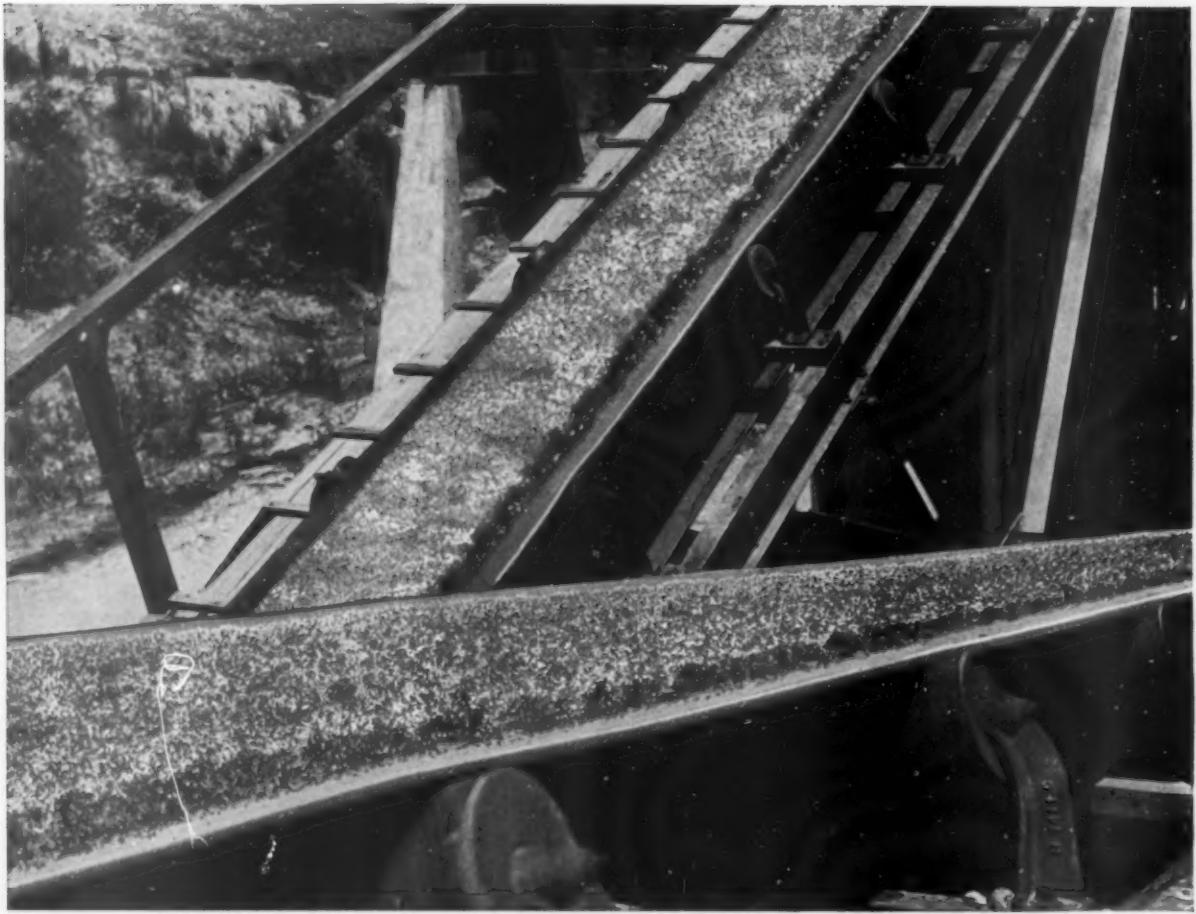
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INTERMEDIATE-SIZE
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There is a Marion of the right size,
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material handling job. Write for
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When you buy a shovel, you are not interested in mere claims. You are interested in facts . . . what that shovel will do measured in terms of maximum yardage at the lowest possible unit operating cost. In this case, Marion has just the shovel for you . . . a machine backed by years of sound engineering, sound features of construction and the sound judgment of many prominent mine and quarry operators. " "

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NEW YORK, N. Y.

MATERIAL HANDLING
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EQUIPMENT

.Rock Products

Vol. 41

Chicago, February, 1938

No. 2

WHAT KIND of CO-OPERATION?

BIG BUSINESS MEN have been in conference with the President; Little Business Men are to have their chance. What will the outcome be? Probably nothing much tangible. The President is reputed to be a much better talker than listener. Granting that he will do some listening, he will probably be able to discern that there is little sympathy between Big Business and Little Business. He will find that in shooting broadsides at Big Business he has crippled a lot of Little Business. Since he apparently sincerely desired to help Little Business, this revelation should prove interesting to him.

Big Business is owned by thrifty members of Society, either directly or through savings banks, insurance companies, etc. It is managed for its unorganized owners generally by men of ability picked by boards of directors, who are largely composed of bankers or professional capitalists. The Roosevelt Administration has no quarrel with the owners of Big Business, or at least it should have none, for these represent a large and highly desirable group of citizens. What it has attempted to do is to break the hold of a relatively small group of professional capitalists on the management of so much actually public-owned Big Business. In this the Administration has not been at all successful.

To deprive the owners of Big Business of the services of expert managers of capital is not desirable, either from the point of view of the owners or of a well organized society. It is only too obvious that neither college professors of economics nor politicians can fill their jobs. All that the times or present economic conditions require is that these professional directors of Big Business be prevented from injuring both the owners of Big Business and the public through the abuse of the economic power their positions give them. Laws and regulations should be aimed to apply to them and not to the inanimate corporations they direct.

Little Business is owned by the men and women who still retain enough initiative to risk their own, their relatives' and their friends' savings and their own time and talents to get ahead in the world. They are held strictly to account for their conduct of such business; and the ordinary laws of business, or the criminal code, is all the protection that either the owners or the public need. Little Business can not long exist, let alone thrive, in an atmosphere of numerous, uninterpretable laws, rules, and regulations. Perhaps we are approaching the time when it will no longer be desirable from an economic or social point of view; perhaps the enterprizers of Little Business are too individualistic for modern society as visualized by New Deal professors. However, if that is the true situation the President has not recognized it, or at least given any indication that he did.

Yet most of the New Deal laws presumably aimed at the abuses of power by directors of Big Business have hurt the managers and owners of Little Business as much or more. The tax on undivided surplus now seems to be as unpopular with Big Business as with Little Business, although probably for essentially different reasons; for no law ever was drawn better calculated to keep Little Business little and save Big Business from new and aggressive competition than this law, which prevented Little Business from acquiring new capital by the only practical method; at the same time leaving the big money markets as open to Big Business as ever.

If all business were Big Business, it could be much more easily regulated; and in general it is much more favorable to such regulation than is Little Business. The reason is said to be that directors of big business are in favor of peace and stability at any price; while the rugged individualist who manages his own business is more inclined to "fight for his rights". Probably the directors of Big Business do not welcome regulation, but it has some compensations for them. The owner and manager of Little Business does not need stable conditions in order to prosper; in fact he often does best under conditions so unstable as to cause his bigger and more unwieldy competitor embarrassment.

From the point of view of labor and of the public insofar as it shares labor's view, Big Business is the more desirable employer, considering reliability of job and pay. From the more human angle of employer-employee relationship, and the preservation of mutual self-respect, Little Business has the advantage under the usual circumstances. That is why Little Business generally can pay lower salaries and wages—that and the fact that much little business is located in little places.

These are a few of the many complications and complexities that may appear to the President if he pursues his discussions with Big and Little Business men. He would have to be better than Solomon to reach a fair and equitable decision. He probably won't attempt to; and his conception of the economics of the situation will be more hazy than it is now. However, there can be a happy ending. Business men, big and little, may thus sound the depths of their own conceptions of economics. They are likely to come to a decision that co-operation should have a healthier development among themselves before co-operation with the President can possibly begin. The machinery for such co-operation exists in the various trade and industrial associations and it has been used—but only to a small extent of its possible use as a native democratic institution.

A Guest Editorial

By JOHN PRINCE
Pres., Stewart Sand and Material Co.

WHAT DOES INDUSTRY NEED?

ALARGE PART OF THE NATIONAL PRODUCTION of sand, gravel and crushed stone is used by the Construction Industry; an industry which has suffered during the depression by a greater shrinkage in volume than has been experienced by business in general. Of course people want to eat and wear clothes even during a depression, and most of them do, but to a large extent they can do without construction, even though it seems impossible to do without motor cars. We can then expect a greater recession in construction and a slower recovery than will be shown by general industry.

During 1930 and well into 1931 construction was sustained by the continued attempt of big business to relieve unemployment. Large expenditures were made for replacement and expansion, but the job was too large and the low point was reached in 1933. Since that time there has been some recovery, but it has in no way kept pace with the recovery of industry in general and, during the 1937 recession, new building has again declined.

According to the Dodge Reports, general construction was at an average volume of about five and one-half billion dollars for 1928-29. By 1933 this had been reduced to 23 percent of that volume. Then recovery began, but for 1936 construction had returned to only 47 percent of the 1928-29 volume. By the end of 1936 the Business Activity Index, as shown by *Business Week*, had recovered to 82 percent of the 1929 index. Construction had recovered at only a little more than half the rate shown by industry in general.

Most business men are in sympathy with the broad objectives of the New Deal. They have used and will use every effort to co-operate in striving for business recovery, reemployment, and a fuller life for the families in the lower income brackets. Large numbers co-operated fully with the NRA, which was the first attempt of the present administration to stop the decline of prices and wages and start recovery. We now realize that this first effort to use national collectivism proved the total inability of ordinary people employed as government officials to plan

and administer all business through the agency of government.

The fact that construction has lagged so badly in general recovery is now held by the President to account for the current recession. If this is true we



John Prince

should examine the methods being employed by the Administration to see if they have contributed to the unbalance of the Construction Industry.

Mixing Recovery and Reform Has Led to Confusion

A large part of construction volume does not rest on individual choice but on the decision of management in its conduct of industry. Some reasonable measure of stability in business is necessary to an adequate recovery of construction. The national objectives have been a mixture of those directed toward recovery and those concerned with reform. The part each has played in this mixture has been so confused and of such shifting proportions that business uncertainty has resulted. Two or three of the methods used have had such a

direct effect on industry that they should be noted.

1. THE WAGNER LABOR ACT and the particular kind of administration given by the National Labor Board have been so partisan that they have created uncertainty and a tremendous feeling of futility in the minds of industrial management. Much of this seems unnecessary. This Act and its administration are undoubtedly an attempt to improve the bargaining parity of labor. In a "free market" all must be free. Our economy will not work if the cards are stacked against labor. In a community ordered by law, all the citizens are not armed to meet the threat of bandits; that would be mob rule. Instead of citizens taking the law into their own hands, the law captures the bandit and takes away his gun. Adequate protection of employees and their right to organize does not require the arbitrary and ruthless exploitation of labor by its leaders and the monopoly of the closed shop. These seem to be the objectives of the present Labor Board. This difficulty seems to come from those who feel that they must administer and direct all the activities of all the people, instead of trying to adjudicate the difficulties as they may arise, under the law, between individuals or groups. These are the methods of collectivism. They tend to restrict the production and distribution of goods and will inevitably lower the general standard of living. It may be that some one-sided and extreme legislation such as the Wagner Act was necessary in order to produce a fair result through later modification. If so, it is surely a commentary on our wasteful methods of settling a problem.

The present feeling of futility on the part of business management is further intensified by the pressure of this administration to pass a restrictive Wage and Hour Bill. When all is understood, this present recession may well be due to this growing feeling of futility on the part of business men. They cannot be expected to fight forever in the face of the dwindling chance for an early abandonment of the hopeless methods of collectivism.

2. THE LACK OF HOME CONSTRUCTION is being particularly stressed at this time. Ways are being considered to reduce the cost of money and to facilitate the financing of homes. This may be helpful to a degree, but the main stumbling block of the past few years has been the lack of sureness of the wage earner and the salaried man in his job. Not so much the rate of pay, as the uncertainty of the future has made him hesitate to pledge his future income for a home. This is the same uncertainty and comes from the same causes as the business man's feeling of futility. Social change by law, if at too rapid a rate, will get ahead of the adjustment that can be made by the average citizen and will create a feeling of uncertainty and futility in the business man and wage earner alike.

3. A LARGE VOLUME OF CONSTRUCTION should come from replacement and expansion of industry. The undistributed surplus tax has been particularly damaging to the construction industry during 1936-37. While it may be easy for the large corporations, with access to the capital issue market to finance a building program by means of a capital issue, the large volume of such construction is the result of planning by many smaller concerns. It has always been difficult for smaller corporations to secure funds for expansion. The use of undistributed earnings has been about the only source of such funds. With the undistributed surplus tax running from 15 to 30 percent of retained surplus, it has to be a rare and exceptional project that will justify this premium. Not only does the Construction Industry desperately need the modification of this tax, but it also needs the establishment of new and practical methods of supplying fixed capital for the smaller industries.

4. ALL INDUSTRY has felt the excessive cost of the national relief program. This, added to the many taxes growing out of the New Deal, naturally raises the question as to how much the country can stand; there is certainly a limit, we are approaching it or perhaps we have passed that limit. This is a general problem, but the methods actually used in administering national relief not only add to the cost, but create in some sections of the country special and serious difficulties for the sand, gravel and crushed stone industries.

W. P. A. Becomes A Competitor

Until late in 1935, national relief was administered by the F.E.R.A. and the C.W.A. as a part of the F.E.R.A. This program was based on Federal participation in and general direction of State administered relief. These agencies carried relief through the worst years of the depression. In 1935 the W.P.A.

was authorized. Several months were required to build up this administrative organization, and at once the administrative costs became vastly greater than under the F.E.R.A. Prior to 1935 in only a few states and in only some localities was the organization used as a political machine. Most of those who did the work in the counties and other political subdivisions of the States worked without pay. It is common knowledge that in a large part of the country, the relief administration in the election year of 1936 became the greatest political machine that ever existed. In some localities the humanitarian project of administering relief was prostituted to the advancement of political groups and local machines.

Many towns, counties, road districts, and other subdivisions were encouraged by the W.P.A. organization to invest in small plants for the production of crushed stone and gravel with the offer of free labor. Local politicians at once saw the opportunity to offer jobs and control votes, not only during the emergency but thereafter. In the less populated states and those having few large cities, projects producing aggregates can be counted by the thousands. The total production of aggregates by such projects has been very large. In those parts of the country having areas of high concentration of population and many cities, it is probable our industry has supplied a substantial quantity of our products to the W.P.A. The permanent advantage of such business is doubtful. If the members of our industry support excessive appropriations for relief, tending to prevent budget balancing the "end product" may be far from pleasant. No one knows why the W.P.A. should think first of the production of crushed stone and gravel as the most available and suitable employment for relief labor. Certainly few men on relief are fitted, either physically or by training, to do this kind of work. This fact, plus the general selection of the supervisory staff on the basis of their value as political workers, may account for the large number of jokes about the cost to the W.P.A. of the shovels broken from excessive leaning on by relief workers.

We can expect a gradual remedy only when relief ceases to be primarily a politically administered job and when projects are set up on the basis of producing the actual goods used by the unemployed.

For years to come in many areas, the sand, gravel and crushed stone industries will be damaged by the fact that various subdivisions of government continue to compete with private industry in this business.

A further difficulty for our industry has been the tremendous diversion of motor and gas taxes by many states

from the maintenance and construction of highways to general relief. Expediency may be pleaded but this diversion carries with it a large measure of misrepresentation. Either we are being kidded or we are surely kidding ourselves. This situation contains much the same element of diversion of funds as is the case with security taxes paid in to the federal treasury to build a reserve, but which actually are used as general revenue to meet all appropriations.

Gas Tax Diversion Menaces Highway Program

When the difficulties confronting us are reviewed, we find them much the same as those which have prevented the revival of construction and disturbed business in general. Both business and labor need desperately to be freed from those influences that stir up class hatreds and create uncertainty. We need to develop further the "freedom of the market" and abandon the idea that collectivism, as it has almost unconsciously developed in this country, will improve our lot. We have had for a long time an increasing number of areas of special privilege. Recently our method has been to balance this by creating special privilege for all. Special privilege means a larger share of national income in return for less effort. When this includes all economic areas, less effort will at once mean less production and a gradual lowering of our standard of living.

The urgent needs of the aggregate industry do not differ greatly from those of business in general. Among them the following seem to be important: We need a fair and judicial administration of a reasonable labor relations law under which labor will not be subjected to exploitation and labor costs will not be frozen beyond the influence of the economic cycle so that production will be restrained. We need the repeal of the undistributed surplus tax, and additional measures found whereby fixed capital requirements of the smaller corporations may be financed. Relief administration needs to be freed from politics and reduced in cost. The tendency to put relief agencies and governmental subdivisions permanently into business should stop.

Is it beyond our reasonable hope that we may obtain these few measures of relief? After years of wishful thinking, after searching for some easy way out of our difficulties through the intervention of government, it is beginning to be apparent that we will have to depend on the straight thinking of the masses and on the initiative of the individual to give us increased production and a broader distribution of things and services that make up our civilization.

Universal Atlas Cement Company Introduces NEW IDEAS IN PACKING CEMENT

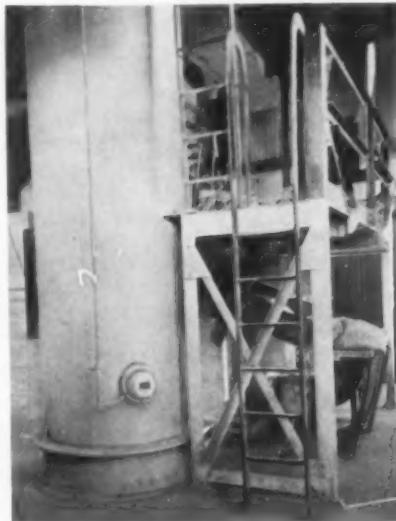
By BROR NORDBERG

WHILE RECONSTRUCTION WORK of major importance is rapidly nearing completion at the Leeds, Ala., and Hudson, N. Y., plants of the Universal Atlas Cement Co., other units are also being less spectacularly modernized. Operating methods are constantly being improved to facilitate the manufacture of a better product, to meet present conditions and specifications and to prepare for future trends in the manufacture of cement and its economical and efficient handling.

Storage capacity for finished cement, from the standpoint of the number of storage units as well as total volume, has figured prominently in Universal Atlas' improvements. Individual plants are being equipped to handle a greater number of cements and to provide additional facilities for tested cements when such are required.

New Method of Feeding Packing Machines

Engineers of the company have developed methods of handling and packing cement at several of its plants that are new in the cement industry. At Independence, Kan., where storage was recently increased by construction of a stockhouse of 160,000-bbl. capacity, several of these ideas have been put into actual practice for the first time in a new packhouse. The old one has been dismantled by the company.



Overflow tank, with level indicators, installed to handle excess cement flowing over the packing machine

Cement is sacked at three new loading stations, each of which has two 3-valve Bates bagging machines. The manner of feeding cement to each of the machines is new and is the outstanding feature of the packhouse. There are no hoppers at the packing machines. The flow of cement from the 16-in. distribution screw conveyors is fed direct to the machines while they

are in operation by dropping through an opening in the conveyor bottom into chutes over the machines.

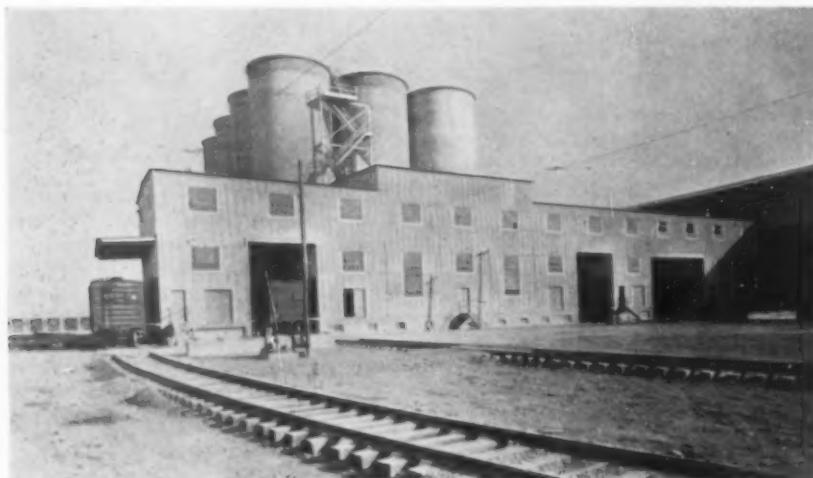
The method of packing is continuous and depends for its successful operation upon a uniformity of weight and density of cement in the chute over each machine. To insure this condition, the feed of cement to the distribution screw conveyor must be such as to deliver slightly more cement per unit of time than the packing machines can handle.

Each packing machine has a 5- x 15-ft. cylindrical overflow tank to take the excess cement, while packing, as well as when there is interruption in the operation of each packing machine. When machines are inactive while moving railway cars, or for any other reason, the spout to the packing machines fills, and all cement goes to the overflow tank.

Bin level indicators are provided at two elevations to indicate the amount of cement in each tank. When there are no interruptions in packing, excess cement is handled as a circulating load. A rotary feeder at the bottom of the overflow tank discharges excess cement to a screw conveyor where it joins the flow of new cement from the storage silos.

A flow meter will be installed to indicate the flow of cement through the system, in excess of packing requirements. An excess flow is necessary to maintain a constant head of cement in the spouts above the packing machines. When the top indicator flashes, the operator knows that the draw of cement from storage is too great and must be reduced. Otherwise the system would be jammed. He accordingly reduces the new feed into the system, and excess cement is drawn from the overflow tank and returned to the system as described.

This system of packing (also at the Leeds, Ala., plant) was developed for several reasons. The use of hoppers is eliminated. It was always difficult to know what to do with the 100 to 300 sacks of cement remaining in a hopper when a run had been completed, especially when the run was to be followed by another of a different cement. Another reason was that a "live", aerated cement could be packed faster and



New pack house of Universal Atlas Cement Co., Independence, Kan., and 12 reinforced concrete silos which increased the storage capacity for cement by 160,000 bbl.

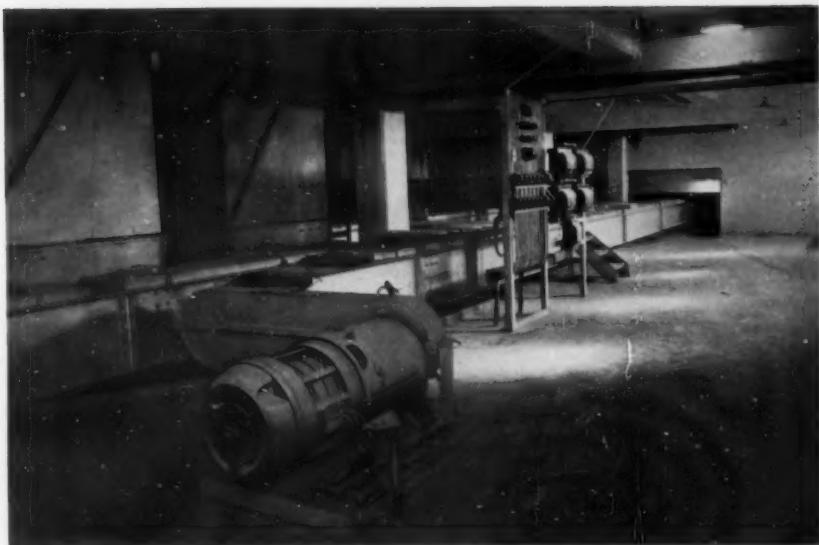
more accurately than the dense, "dead" cement which has remained in hoppers for a considerable length of time. Such cement is inclined to surge and variable amounts would pass the tube shut-offs in the packing machines during the cut-off period. These discrepancies in bag weights have been eliminated by packing a live cement, which insures that a uniform number of pounds of cement are being packed per second.

The distribution screw conveyor is extended beyond the overflow tank at each loading station for loading bulk cement into cars. The conveyor discharges directly to the spouts for filling railroad cars.

Dust Collector for Bag Cleaning

Another interesting feature of the new packhouse is the method of cleaning bags, which was developed by company engineers several years ago and is now being placed in operation for the first time. It consists of a semi-circular steel table, on the distribution screw floor above a loading station, and an air duct connection from a bag-type dust collector to a slotted opening in the table top. The dust-collecting units above each of the three loading-out stations are rated at 3600 c.f.m. and the other for the elevator heads has a capacity of 1200 c.f.m.

The cleaner duct opening is 5 or 6-in. wide and about 14-in. long—the width of a bag. The operator, from his sta-



Collecting screw conveyor which carries cement to the elevators feeding the distribution screw conveyors on floor above

tion within the semi-circle, can clean, sort and handle the bags with a minimum of wasted effort.

In actual practice, the operator holds two corners of a bag while the other two-thirds of the bag length is placed over the duct. The suction of the dust-collecting equipment draws the free end of the bag into the duct where it is subjected to intensive beating action. The operator then turns the opposite side of the bag up and subjects its other

end to the collector, enabling him to inspect the sacks while cleaning them.

When cement has set on the seams of the sack, the open end is placed over the duct opening in the table top. The suction turns the sack inside out and the set particles are dislodged by the beating action taking place within the duct. After being cleaned, sacks are sorted and placed in separate piles on the table.

This system has proven to be economical for cleaning and sorting returned sacks and is most effective when the sacks have been completely emptied by the user. Cement carelessly left in the sacks in appreciable quantities increases the time required for cleaning and reduces the savings resulting from the use of this system as compared with the wheel type of sack cleaner.

Flow Sheet of Operations

The new stock house consists of 12 reinforced concrete silos, 26 ft. in diameter and 80 ft. deep, with six interstice bins. Capacity of each silo is 11,000 bbl., and each interstice bin provides for 4500 bbl. storage. A 7-in. type H Fuller-Kinyon cement pump distributes cement to the silos, and cement is drawn from each silo at nine points through manually-operated slide gates. Air lines are provided to facilitate the discharge of cement.

From here on cement is handled to the loading-out stations by screw conveyors and elevators. From the silos three 16-in. screw conveyors, 140 ft. in length, convey the cement to two 16-in. gathering screws, which in turn deliver the cement to the boots of two 55-ft.,

(Continued on page 45)



Bag-type dust collector at the elevator heads in new pack house. To the left is the electrical control panel and to the right the screen preceding the distribution screw conveyor

Fitting Local Requirements to

NATIONAL STANDARDS for AGGREGATES

By STANTON WALKER

Director of Engineering, National Sand and Gravel Association and Chairman,
Joint Technical Committee, Mineral Aggregates Association

SPECIFICATIONS FOR AGGREGATES used in the construction field differ widely in different sections of the country. Some of the differences are necessary to take into account local conditions, but a great many of them come from inherited practices without any sound basis of engineering need. Unnecessary lack of uniformity in requirements creates an uneconomic condition and causes producers to stock more types of materials than are actually needed for the work in hand. Standardization of requirements, within the limits permitted by local conditions, is a crying need of the aggregates industries and can be brought about only through the coöordinated efforts of producers and users in each section of the country. Whatever the competitive differences in the aggregates field, that is a problem which can be attacked in harmony and with mutual benefit to all concerned.

Specifications for construction aggregates generally fix limits on four principal properties, which may be roughly classified as: soundness, or durability; resistance to abrasion, or some other measure of hardness and strength; soft and friable particles and other deleterious substances; and size and grading. Limits on the first three usually take into account, at least in some degree, the characteristics of the materials available in the locality to which the specifications apply. While a great deal needs to be done in the standardization of such limits, it is variations in requirements for size and grading that afford the most obvious opportunity to eliminate waste.

Why Should State Specifications Vary?

Sizes of aggregates must, of course, depend somewhat upon availability of materials, but there is no good reason why, in the vast majority of cases, specifications for grading of a given size should not be uniform—or, at least, similar. Why, for example, should the highway departments of adjacent states, served by the same group of producers, have requirements for concrete aggregates differing no more than the gradings



Stanton Walker

tions shown in Table 1. Those differences, as small as they are, are enough to require separate stocks of materials—and where is the engineer who will say that one grading is outstandingly better than the other.

The development of generally acceptable standards for size and grading of aggregates has been, for many years, an important objective of the three national mineral aggregates associations—the National Crushed Stone Association, the National Slag Association, and the National Sand and Gravel Association. Without going into the history of that development, it can be said that the three associations, through the co-operation of the Division of Simplified Practice of the National Bureau of Standards and other standardizing bodies, have arrived at recommendations covering coarse aggregates which, it is believed, may be applied successfully in any locality. Those recommendations have found wide acceptance among national standardizing bodies and have received, and are receiving, recognition by many local groups. They were developed after a comprehensive study of many specifications, and are designed to permit of being applied

with a minimum of change in past practices. They provide the basis for specifications of such groups as the American Society for Testing Materials, the American Association of State Highway Officials, the Federal Specifications Board, the Joint Committee on Concrete and Reinforced Concrete, and others. While neither of the three associations has prepared recommendations covering fine aggregates, they are represented on committees of many of the national groups developing such specifications and have co-operated, with considerable success, in the effort to bring about uniform requirements. National specifications provide authoritative guides for the coöordination of the efforts of producers and users in different localities in bringing about standardization of sizes and gradings and the reduction of waste.

A tabulation of the recommended gradings for all construction purposes would be too lengthy for this article. For greater detail than is given in the illustrations discussed in what follows the reader is referred to:

Simplified Practice Recommendation R 163-36 of the National Bureau of Standards of the U. S. Department of Commerce (covers coarse aggregates—crushed stone, gravel, and slag).

Tentative Specifications for Concrete Aggregates (A.S.T.M. Designation: C 33-37T), 1937 Proceedings, American Society for Testing Materials.

Tentative Specifications for Standard Sizes of Coarse Aggregates for Highway Construction (A.S.T.M. Designation: D 448-37T), 1937 Proceedings, American Society for Testing Materials.

Standard Specification for Size of Aggregates, of Standard Specifications for Highway Materials of the American Association of State Highway Officials.

Specifications for Materials; Progress Report of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete, published by American Concrete Institute.

Federal Specification for Aggregate for Portland Cement Concrete (SS-A-281).

Other references could be given, but these are among the more comprehensive. With few exceptions, the gradings for the coarser sizes are in accordance with the Simplified Practice Recommendations. The fine aggre-

gate recommendations differ in some details, but are essentially the same and nearly enough the same that one grading can be made to meet all requirements for a given use.

How to use these recommendations of standardizing bodies should be obvious. They have been formulated in the light of careful consideration of engineering need and practicability of production. They have been promulgated by groups made up of leading engineers of the country and have all of the authoritativeness of the combined thought of such engineers. Since the recommendations are for general application, the limits are sometimes broader than necessary for local use, but specifications within those limits represent good engineering practice in any locality.

TABLE 1. EXAMPLE OF OVERLAPPING SPECIFICATIONS FOR CONCRETE PAVEMENT COARSE AGGREGATE

Screen Size, in.	Percents Passing	
	State A	State B
2 3/4	100	—
2 1/2	95-100	—
2 1/4	—	100
1 1/4	30-65	50-80*
3/4	—	15-45*
5/8	5-20	—
1/2	—	10-25
3/8	0-8	—
1/4	—	0-4

* Applies to gravel; for stone, limits are 45-75 and 20-45.

Producers and users, and particularly producers serving more than one jurisdiction, should examine the specifications governing their practice in the light of national standards for grading.

Recommended Gradings of Coarse Aggregates

Table 2 gives recommendations for gradings of coarse aggregates for concrete outlined in Simplified Practice Recommendation R 163-36, promulgated by the Division of Simplified Practice of the National Bureau of Standards. It should be emphasized again, that specifications of such national organizations as the American Society for Testing Materials, the American Association of State Highway Officials, and others, and an increasing

TABLE 2. GRADINGS FOR COARSE AGGREGATES FOR CONCRETE From Simplified Practice Recommendation R 163-36

Sieve Size or Number	Percents Passing Each Size Simplified Practice Number					
	4A	34A	234A	5B	45B	345B
2 1/2 in.	—	—	100	—	—	—
2 in.	—	—	95-100	—	—	100
1 1/2 in.	—	100	—	—	—	95-100
1 in.	—	90-100	35-70	—	100	—
3/4 in.	100	—	—	—	90-100	35-70
1/2 in.	90-100	25-60	10-30	100	—	—
3/8 in.	40-75	—	—	90-100	20-55	10-30
No. 4	0-15	0-10	0-5	0-20	0-10	0-5
No. 8	0-5	—	—	0-5	0-5	—
Nominal Size	No. 4-1/2 in.	No. 4-1 in.	No. 4-2 in.	No. 4-3/4 in.	No. 4-1/4 in.	No. 4-1/16 in.

number of state highway departments and other bodies are based on those recommendations. The limits shown represent approximately the narrowest permitting of economical production in the average plant. Recommendations for other uses are also included in the simplified practice report. It should be pointed out with respect to the gradings in Table 2 that sizes 4A and 5B are intended, for practically all cases, as alternates for the same use and the same is true of 34A and 45B and of 234A and 345B. It is not intended that both groups be produced by one plant, except in special cases.

Table 3 shows typical specifications for grading of fine aggregate for concrete. Those requirements are supplemented by a provision that for any one project the fine aggregate shall not vary in fineness modulus more than 0.20 from the average sample submitted before the start of the work. In the case of the Joint Committee specification, the Joint Committee calls attention to the fact that the relatively wide range in grading shown in Table 3 should be permitted only when it is economically impracticable to obtain other materials meeting more restrictive requirements. The most desirable grading, says the committee, will depend upon the type of work and the class of concrete. For the leaner mixes, or when a small size coarse aggregate is used, and in cases where the degree of workability is important, it is desirable to further restrict the allowable ranges in grading so as to insure one

approaching the maximum percentage passing each sieve: On the other hand, for richer mixes, in the interest of maximum strength and economy, a grading as coarse as is consistent with the requirements for workability should be specified. The Joint Committee recommends, however, that in no case should a range in grading on any one sieve less than indicated below be required:

- No. 16 Sieve—20 percent
- No. 50 Sieve—15 percent
- No. 100 Sieve—5 percent

Experience has not shown definitely whether or not the provision covering permissible range in fineness modulus is too restrictive. Some producers have found it may cause difficulty, and at the present time studies of the uniformity of the products from different plants are being made to determine whether or not they fall within the range permitted by that limitation. In spite of such details, the gradings shown in Table 3, which, it will be observed, are practically uniform, provide an excellent basis for bringing specifications of different localities into substantial agreement.

If producers and users of aggregates in the various sections of the country will familiarize themselves with the recommendations of national standardizing bodies they can do much to eliminate overlapping and duplicating requirements which make necessary the handling of more sizes of materials than are needed to carry on construction work in the most efficient manner.

TABLE NO. 3. TYPICAL SPECIFICATIONS FOR GRADING FOR FINE AGGREGATE

Sieve Size or Number	Percents Passing Each Sieve			
	A.S.T.M. ¹	A.A.S.H.O. ²	Joint Committee ³	F.S.B. ⁴
3/8 in.	100	100	100	—
No. 4	95-100	85-100	95-100	95-100
No. 16	45-80	35-80	45-80	45-80
No. 50	5-30	2-30	5-30	5-30
No. 100	0-8	0-5	0-8	0-10

¹ American Society for Testing Materials.

² American Association of State Highway Officials: The figures shown in the above table are suggested as limiting percentages. They should be altered within these extreme limits to suit local conditions. In the interest of workability, it is recommended that, wherever practicable, the minimum amount passing No. 4 sieve be at least 90 percent and the minimum amount passing No. 50 sieve be at least 5 percent.

³ Joint Committee on Standard Specifications for Concrete and Reinforced Concrete.

⁴ Federal Specifications Board.

SANTA CRUZ PORTLAND CEMENT Co., San Francisco, Calif., is reported to have settled a United States Government claim for \$40,307, in connection with its 1930 and 1931 income taxes, for \$32,962. The deficiency assessments are reported to have arisen from depletion charged by the company at a rate in excess of the government estimate of this rate. The total tax deficiency assessment against the company over a period of several years is reported to be around \$500,000.

Increased Cost of Coal Demands Better Analysis

BUY HEAT UNITS—NOT COAL

By RALPH S. TORGERSON

No commodity enters so largely into the costs of the average cement or lime producer as coal. Any substantial increase in the price of this fuel, therefore, will be reflected in the cost of production, and must either be passed on to the consumer or taken out of the profits, if any. As most rock products producers operate on a relatively low margin of profit, the increased cost cannot be absorbed but must be passed on to the buyer.

With the Guffey-Vinson Act fixing the price of coal at a higher level, ranging from 5 cents to 20 cents per ton for steam sizes depending on the quality and the field from which it is obtained; with a recent increase in railroad freight rates up to 15 cents per ton in certain regions, and a strong probability of an additional flat increase in freight rates of 15 percent, coal prices are expected to rise rather precipitately. As the average freight rate on bituminous coal in 1937 was \$2.25 per ton, the flat rate increase of 15 percent would amount to 34 cents.

Increased Freight Rates And Price Fixing

The situation is causing real concern, particularly among cement manufacturers and lime producers. It has been estimated that in the cement industry approximately 6,000,000 tons of coal were burned in 1937. The lime industry probably used about 1,500,000 tons of coal last year. Increases ordered by the National Bituminous Coal Commission, under authority of the Guffey-Vinson Act, and the higher freight rates undoubtedly will result in an increase of at least 50 cents per ton in the delivery price of coal, representing an addition of \$3,000,000 to the coal bill of the cement industry and nearly a million dollars for lime producers.

Cement manufacturers undoubtedly will look to further improvements in plant to effect fuel economies. It is expected that the trend toward the installation of coal mills for direct firing will be accelerated by the increased coal cost. Lime producers also will be searching for methods and equipment which will result in more efficient use of fuel.

Large tonnages of coal also are used by many crushed stone and sand and

gravel operators who continue to generate power with coal-fired steam plants and use coal for fuel in drying. Increases in the price of coal for these operators will result in plans to convert their present plants for the use of other fuels, to purchase power from central plants, or to change over to other power units such as Diesel and gasoline engines.

Fuel Economies Through Careful Analysis and Sampling

In the case of cement manufacturers and lime producers, however, the vast majority will continue to use coal for firing kilns and for other fuel purposes. The only other avenue left these companies to combat the increase in fuel costs is to buy heat units rather than coal. A careful analysis of the coal purchased will more than compensate for the additional cost involved in buying suitable laboratory equipment and the time which may be devoted by chemists to this work. As pointed out by Rapier R. Coghlan in *Rock Products*, November 19, 1932, p. 20, a one percent decrease in B.t.u. value of the coal means a loss of \$10,000 on a \$1,000,000 annual fuel bill.

Buying of coal on a heat unit basis is more general today than it has been in the past, but careful sampling and analysis of coal by the consumer will pay real dividends in fuel economies. There are also less measurable but nevertheless real economies obtained by the production of a better product.

Bringing the problem down to cases, it is estimated that a dry process cement plant having an annual capacity of 1,000,000 bbl. will require about 60,000 tons of coal annually, costing about \$200,000. An increase of 50 cents a ton, based on probable results of freight rate advances and price-fixing through the operations of the Guffey-Vinson Act, would result in an addition of \$30,000 to the coal bill of one cement company. This certainly should prove to be sufficient incentive to bring about closer buying of coal through careful sampling and analysis.

The American Society for Testing Materials has developed a method of sampling coal and a standard for making analyses which should be adopted by every large purchaser. Some cement laboratories and many of the lime pro-

ducers' laboratories are not properly equipped to make accurate determinations of volatile matter and fixed carbon although the furnace used for this purpose is not expensive. Nearly all laboratories, however, are equipped for proper ash, sulphur, moisture, and B.t.u. analyses.

There are two types of analyses employed by users of pulverized coal, one known as the "proximate analysis" and the other as the "ultimate analysis." The "proximate" analysis determines the percentage of moisture, volatile matter, fixed carbon, ash, sulphur and heating value. While the "proximate analysis" is quite generally used to check up on the quality of coal, a better picture of the results from the standpoint of operating efficiency is obtained by the "ultimate analysis" in which the percentages of the ultimate constituents of the coal as carbon, hydrogen, nitrogen, sulphur, oxygen and ash are determined.

Geological Survey Bulletins Are Helpful

It would be very helpful if the cement and lime company laboratories would secure the State geological survey bulletins, covering the source from which coal supplies can be obtained without paying excessive freight rates. An excellent example of this type of literature is Bulletin 56, Illinois Coal, by A. Bement, published by the Illinois Geological Survey in 1929. This bulletin describes the method of making "proximate" and "ultimate" analyses of coal and how to calculate the correct amount of air for complete combustion. A recent publication of the Bureau of Mines, Department of Interior, Washington, D. C., entitled, "Analyses of Colorado Coals," Technical Paper 574, has a fund of useful information for the coal buyer seeking his supplies from Colorado. This bulletin includes analyses of delivered coal from every mine in the state, and also "proximate" and "ultimate" analyses from every mine, all worked out. For those who wish to make a more thorough study of methods of sampling and analysis, ample sources of information on the subjects will be found by referring to the Bibliography of United States Bureau of Mines Investigations on Coal and Its Products, Technical Paper 576.

New Sand and Gravel Transport of Unusual Design

ALL-STEEL TUG and FIVE BARGES

By E. L. SHOEMAKER

Chief Engineer, Warner Co., Philadelphia, Penn.

ONE OF THE MOST IMPORTANT JOBS that the Warner Co. now has under way is the construction of five new all-steel hopper barges. A new steel tug, built by the company, is now completed and in service. The new barges and the tug will be used for the transportation of raw material from the dredge operating on an inland lake near Morrisville, Penn., to the Van Sciver sand and gravel plant of the company near by.

Maintenance forces of the company are building the barges in a field shipyard erected on the banks of the lake, and it was planned to launch the first of the five new barges in December. In the drawing are shown details of the barge and tug design, and also the location of the power plant and other equipment on the tug. Different stages of construction are shown in the illustrations.

The five hopper barges are very stur-

First Prize Winner

Article by Mr. Shoemaker, which has been awarded First Prize in ROCK PRODUCTS' annual contest for new ideas in equipment and maintenance practices, describes interesting types of marine transport.

dily built of steel plates, welded throughout, in order to withstand the very severe service and frequent movements between the dredge and the plant. They will have about 60 percent more capacity than the wooden barges which they will replace. Each boat is 10 ft. 6 in. by 24 ft. by 100 ft.

It will be noticed that the rake ends have an elliptical profile which is the

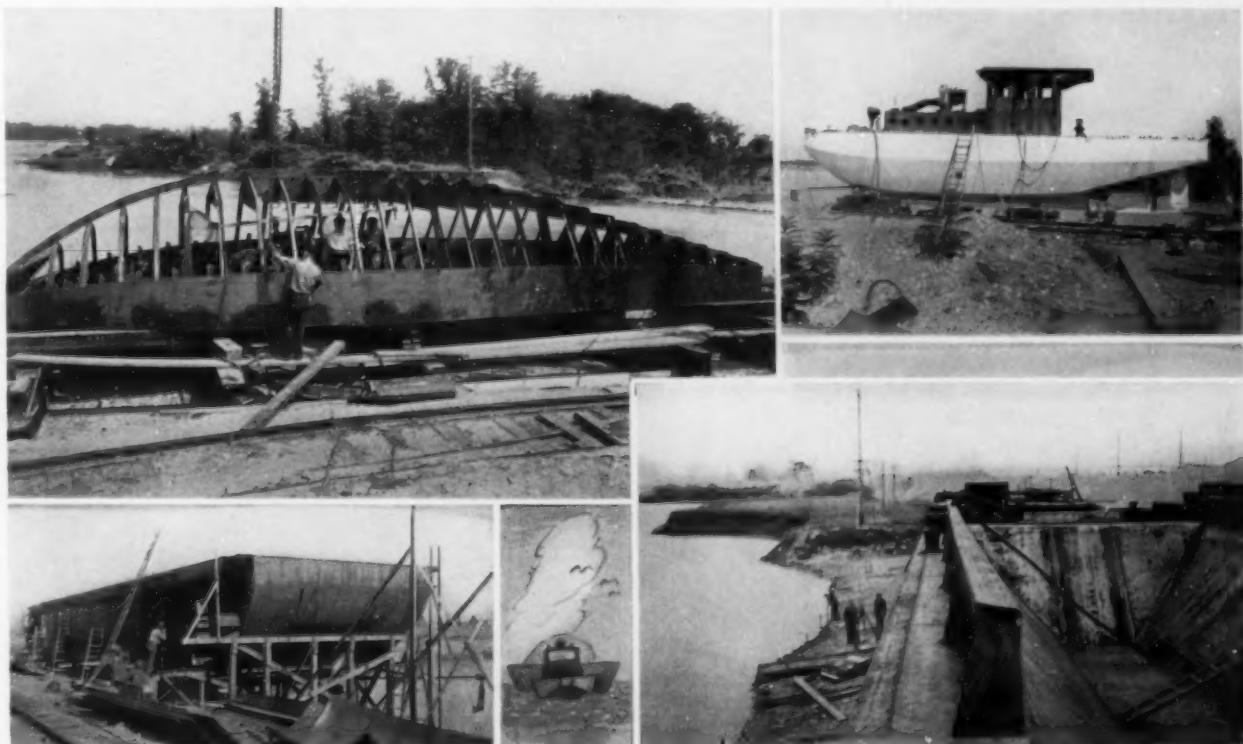
same as that used on the company's river barges operated for the transportation of finished material. Corners are liberally rounded to a 24-in. radius to make towing easier, and also to avoid damage when the corner hits any fixed construction.

The Tug "Vanguard"

Illustrations of the new tug, "Vanguard", show the design and structural features which make the boat a very efficient unit for this service. The design was adopted for the following reasons:

1. Construction was cheaper because all the ribs and frames are rectilinear, and the plates are only curved, not warped; thereby permitting wider plates and fewer welded joints.

2. The hull is very strong to withstand the hard service. The top plates on each side are $\frac{1}{2}$ -in. thick, and the



Above, left: All-welded steel tug in the course of construction. Right: Completed tug. Equipment on deck house is only a fan used by the painters for ventilation and is not part of the finished boat. Below, left: Construction view of one of the five barges. Right: Looking down into hopper type barge

rest of the plates are $\frac{3}{8}$ -in. in thickness.

3. The boat is an exceedingly good puller under load, although only a fair free-running boat. However, in this service the tugs are always pulling a load.

4. It has extremely good maneuverability; the tug seems to be able to turn almost in its own length.

The entire boat is made of steel, the only wood in it being the floor for the pilot. At the rear of the pilot house, there are double doors to give the pilot immediate access to the stern bitts. It will also be noticed that the stern bitts are placed well forward which is an advantage in towing. The tug is 48 ft. long, 14 ft. wide, and has a draft of 5 ft. 3 in.

Diesel Engine and Drive Equipment

Ample power is available with the 152-hp. Buda Diesel, which has built-in reversing clutches and a reduction gear of 2.9:1. An interesting feature of the drive is that the SKF spherical roller thrust bearing is mounted integrally with the forward end of the stern tube. Mounted in this way, the propeller thrust goes direct to the hull and not through the thrust bearing of the engine, according to the usual practice. The stern shaft and engine are connected by means of a shaft provided with Spicer



Tug "Vanguard" in service

universal joints at each end, one end having a splined telescopic joint. The propeller is a three-blade type of bronze, having a 48-in. diameter and a 24-in. pitch.

At the forward end of the engine room, the collision bulkhead forms a bow compartment. This is filled with the fresh water used for engine cooling. It is not feasible to pump from overboard since much of the water is dirty and harmful to the engine. Fresh water in the bow compartment is cooled by the action of the outside water in contact with the shell plates.

The steering wheel column is equipped at its lower end with a double width sprocket to take standard roller chain of $\frac{3}{4}$ -in. pitch. A short length of chain goes around this sprocket, and a tiller cable with turnbuckles goes direct to the rudder post. Instead of a quadrant, a standard pressed steel pulley was used.

Equipment is all arranged to provide for one man control and one man opera-

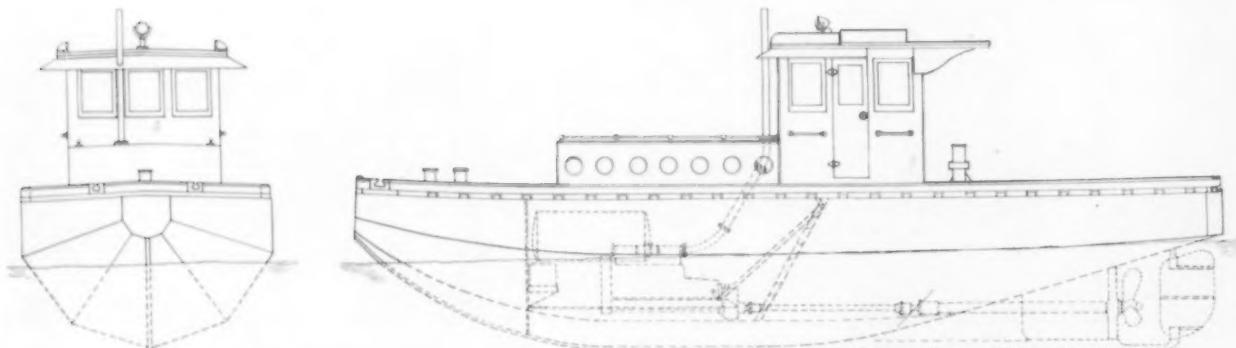
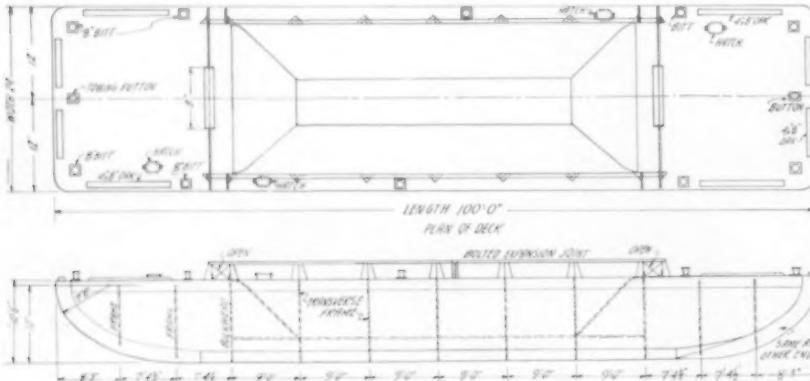
tion. The engine is provided with a 32-volt generator and starting motor, and Superpower Diamond Grid batteries of 327 amp. hr. capacity, supplied by the Philadelphia Storage Battery Co. The boat is fully-lighted for night operation, including a "Half Mile Ray" searchlight.

To provide sufficient power for lighting and electric hand tools, the tug is provided with a Master Electric Co., motor-generator set having a 110-volt, single phase, 60-cycle motor and a 32-volt direct current generator. When the tug lies at the wharf, a shore line is connected. The boat is wired for 32 volts d-c., when in operation, and 110-volt a-c., when lying at the wharf, for lighting and the use of electric hand tools.

Possibility

BANGOR, PENN., SLATE INDUSTRY is the subject of a series of four articles by Edwin B. V. Larson in the *Easton (Penn.) Express*. Mr. Larson's articles occupy about two columns each and are illustrated. They are designed to show the possibilities of this at present neglected industry, and to arouse local financial support, apparently. The idea back of these articles is apparently a good one, and one that might be followed by similar industries in other localities. The principal difficulty with the slate industry appears to be the problem of distribution. Efforts to sell through building supply dealers have proved inadequate in meeting competition with other materials, new and widely advertised. The quality of the product alone will not sell it through dealers. Regular salesmen calling on architects have made sales.

NATIONAL GYPSUM CO., Buffalo, N. Y., has let a contract for a new mill structure on the waterfront at Mobile, Ala. Wallboard and building products will be manufactured in the new plant which, it is reported, will cost about \$1,000,000 with equipment.



Above: Elevation and plan details of steel barges. Below: Front end of Tug "Vanguard," and elevation showing location of power plant, drive shaft, and propeller, and the water line when the ship is afloat

Job Analysis Requires Engineering Knowledge

TRENDS IN EXCAVATION and STRIPPING

By KENNETH F. PARK*

MOST INDUSTRIES are reaching a point where lower production costs are essential to continued profits, and at no time for many years has there been such a general grouping for greater efficiency as at present. To meet this need, a tractor-combination trend has developed in materials handling which must be given recognition.

The combined problems of digging and transporting material—be it stripping or the pay streak—are going through a definite transition wherever they lie, and in all of the industries. Digging machines must deliver greater quantities, lend themselves to general excavation with greater versatility than in the past and they must operate at less cost. The transporting or carrying equipment must be more flexible, have greater capacities, move faster, unload quicker, operate with greater economy.

Tractor Combinations

Ranking high in the group offering greater performance and lower costs are tractor combinations. The tractor is now a long familiar machine, but the rapid development of excavation and carrying units has sped its perfection.

A notable development for excavation work is the carryall scraper. This machine, in conjunction with a tractor taken from the excavating contractor's kit of tools, is a highly versatile, one-

man unit. Here is a machine combining excavation, hauling, and dumping in one package. It is a combination, confined to a single investment, for a series of operations normally requiring several allied tools.

The miscellaneous operations of the rock products industries lend themselves admirably to this type of work and many plants and quarries, producers of sand and gravel, limestone, cement, gypsum, silica, and other related products, are now using this equipment. The carryall picks up its own load in a minute's time, carries it over average ground conditions in high tractor gears and dumps in a fraction of a minute in controlled layers up to two feet, or instantly over a trap or hopper.

Such work as overburden stripping, building roads, railroad grades, picking up sand and gravel, stockpiling, or in fact any material movement except extreme rocky conditions fall easily within the scope of this machine's operation. The carryall can cut to any depth down to 8 in. or skim a fractional inch cut over an ore body. The depth of the material in which the machine works does not effect its most efficient operation as with other digging tools. With but 2 in. of dirt overlying a valuable stripping area, the machine works as effectively.

The scraper has proved highly efficient both as a loading and hauling tool. The

popular 12-cu. yd. model will fill itself at the rate of eight excavation yards or more in a minute, thus developing a digging or loading capacity of 480 cu. yd. an hour. Loading time loss is unknown.

In hauling proper recognition must be given to the pneumatic tire, which has reduced draft materially and cushioned heavy machinery for an easily recognized saving in maintenance and repair costs. Any other hauling unit, it may be added, would necessitate periodic road maintenance at additional cost, whereas the carryall does this work, without loss of time, in returning from its load delivery.

In unloading, this machine pushes the material out of the bowl, while traveling, in controlled depths up to two feet, or turns and backs for end dumping. No additional equipment is required to keep a spoil area leveled off. In the case of emptying over a hopper or trap, the scraper dumps its load the same as any other kind of carrier does. Where compaction is required, as in some storage materials, the tractor-carryall unit gives a dense fill.

Trucks, as carriers, are generally credited with faster hauling speeds but the working speeds of tractor-carryall combinations are surprisingly comparable, except on extreme long hauls. Even where long hauls are encountered, the great capacity of the machine often offsets the benefit of speeds inherent in a group of small trucks. Large trucks of similar capacity represent investments nearly equivalent to the combined costs of tractor and scraper, and are forced into speeds below those of a tractor on steep grades and bad going.

Allied Units

Other smaller digging and rooting tools can be profitably added to the same tractor set-up to give a selection of units capable of a variety of work usually handled by one-purpose machines. On a small operation, one tractor, fitted with a suitable power control unit, can be equipped with auxiliary tools to handle dozers, rooters, cranes, and carryall scrapers. Any tool can be quickly dropped in favor of any other, or worked in several economical combinations. A formidable equipment investment is thus

*Chief Field Engineer, R. G. Le Tourneau, Inc.



Angledozer used with carryall scraper improves road as scraper returns to the cut. Equipment in operation by Marquette Cement Mfg. Co., at Oglesby, Ill.

avoided and one power source serves a multitude of applications. Naturally where enough work warrants machines devoted to a single purpose, the economy of their separate operation is greatest.

The bulldozer or angledozer is probably the finest small tool excavation unit for a tractor. Its many applications easily place it as the most useful tool around excavation, material-movement, or where other machinery must receive outside aid in maintaining its best performance. For the multitude of small operations around any project such as short-haul dirt and rock movement, clearing brush and stumps, backfill, clean-up work, pioneering new roadways, leveling old ones, and many others, there is no tool made which becomes so indispensable. Many small companies place a dozer on the same tractor operating a carryall scraper. The application is simple, only necessitating an extra front end power control unit on the tractor. Either tool can be quickly dropped in favor of the other, or can be used profitably in conjunction on the same work. Thus a single tractor investment covers separate operations normally requiring two tractors. The angledozer is an angling blade which can be used as a bulldozer or angled in either direction to sidecast excavated material, simulating the blade performance of a grader. This blade can also be allowed to float so that the last few inches of material over ore bodies can be removed more easily. The bowl, thus loosened, oscillates in every direction to keep the blade in contact with the ground and free from the influence of the tractor, which normally causes the blade to lose a portion of a gathered load on a sideling stretch.

The scarifier or scratching machines offered as rooters should not be confused with the deep digging tools here mentioned. The best models have three teeth, staggered to aid big rock clearance. Three, two, or one standards can be used in keeping with the difficulty of the work encountered, and where extremely tough material is met, heavy weights on the standard base increase the penetration. The teeth can be sunk down to a controlled depth of 28 in. and a wide variety of hard formations give way to the enormous amount of power which can be thrown into the machine. Such formations as hardpan, cemented gravels, decomposed shales and slates, some sandstones, boulders, etc., are torn out of place at a cost far below that for breaking up the same material by shooting. The same power source operates a scraper or allows pairing up between the bulldozer and rooter on the same tractor. Thus one tractor fitted with a suitable power control unit serves several purposes which normally require the work of a number of machines. The



Carryall scraper pulled by tractor moving a load of sand in operation at the Ottawa Silica Co., Ottawa, Ill., plant

most recently developed tractor-crane should not be overlooked in this general comparison.

Planning the Application

When a job analysis is to be made, an engineer familiar with all phases of earth and rock movement and cost establishment should be called in for consultation. A study of present methods should be made and new applications suggested in keeping with present and future requirements. Since the ultimate acceptance of some part of this application trend seems inevitable, it is well to give it consideration in the transition now in progress over the country.

Hauls should be established and plant capacity, or job requirements, noted and the proper equipment chosen for the work. Unit prices should be built up, and production figures established. The number of machines required should be determined, and their cost to the purchaser.

Equipment, operating, and ownership costs should be built based on local prices, and a per ton or per cubic yard cost established. This final item is the answer in considering a new application, and the reputation and past record of the manufacturer should be considered in accepting even the most elaborately prepared recommendations.

Production

Output depends upon length of haul, size of unit, classification of excavation, disposal of hauled material, grades, and other conditions encountered. The rated output of the carryall scrapers varies up to over 200 excavation cu. yd. an hour. The most popular and best all-round machines have a struck capacity of about 12 cu. yd. The rated output of this size unit, compounded from hundreds of job statistics is illustrated on the production graph. Production, as here represented, is dependent, not primarily upon the haul distance in feet, but upon the total time required per round trip of the scraper on a haul of

any given length. This total time, in turn, is determined by two factors; the variable time, or length of haul, and the fixed time comprised of average loading and dumping times and two turns. After determining an average load quantity, a lost time factor is applied to give the final results. In thus presenting production figures in the graph, the 100 percent efficiency curve actually represents a throughout-the-job efficiency some 15 percent lower than the theoretical perfect quantity.

Several factors entering into the determination of operating efficiency as used with this type of earthmoving equipment are: model of scraper, efficiency of tractor, efficiency of operator, and working conditions including weather, grades, type of material handled, delays, etc.

Cost Determination

Ownership and operating costs are variable as applied to final yardage or tonnage costs because of the many methods set up by the individual cost systems of different industries. There are several factors which belong in the final analysis of costs, however, regardless of where they are placed; namely, depreciation, interest, insurance, and taxes, commonly classified as fixed charges; and operator, fuel, grease, and oil, repairs, maintenance and parts classified as operating costs. These two give a total ownership and operating cost of the individual unit, not including such items as supervision, overhead, freight, allied applications necessary to the prime movers' efficient operation, and the multitude of small intangible costs applied to the job in its entirety, or a series of operations blanketed under an unclassified unit bid. A well prepared recommendation should include as many of the above items as can be properly charged to the operation of the unit in consideration, and recognition given the other items contributing to the final cost analysis.

The type of equipment in question

which has so definitely established a trend is being used by the Marquette Cement Manufacturing Co. at its new Oglesby, Ill. quarry. To open the new quarry early in 1937, Marquette supplemented its regular stripping equipment with a LeTourneau 12-Yard "U" scraper pulled by a Caterpillar D8, 95-hp. Diesel tractor, on which was mounted an angle-dozer with power take-off operating from the front end of the tractor. To expose the rock which will be shot out, 30 ft. of wet overburden, consisting of top soil clay and some gravel, had to be removed. The haul from the cut to the spoil bank was up-hill, 300 ft. of 5 percent grade, 300 ft. of 15 percent grade. The tractor pulled the full-loaded carryall, with approximately 11 tons of excavated material, up the 5 percent grade in fifth gear, up the 15 percent grade in second and returned empty in sixth gear. On each trip, the previously dumped load was dozed over the edge of the spoil bank on to soggy land to ultimately build a large waste area. The round trip was 1500 ft. average, and the cycle, including one minute for angle-dozing the previous load over the bank, was 6.6 minutes or 9.2 trips an hour. Handling eight place yards a trip, the production was 74 cu. yd. an hour, which included digging, loading, hauling and dozing into spoil banks.

Pennsylvania-Dixie Cement Corp.'s quarry, near Clear Lake, Iowa, is another user of tractor-drawn LeTourneau carryall earth movers. In May, 1937, there were three 12-*yd.* scrapers at work moving 50,000 cu. yd. of wet, sticky clay overburden, opening the way to a new cut. After the softer surface and subsoil had been removed, a three-

tooth, heavy-duty, cable controlled LeTourneau rooter was used to enable the scrapers to pick up larger loads more easily. The rooter ripped the hard subsoil to a depth of 20 in. at each trip. Over the scraper haul, which averages 1950 ft., round trip, the D8 tractor traveled in fifth and sixth gears over negligible grades in 7.5 minutes—eight trips an hour. At eight excavation yards an hour, the scraper moved 64 place yards.

Another use for this tractor-scraper method is employed at the Mascot, Tenn., mine of the American Zinc Co. Stored pulverized limestone, a by-product of zinc concentration, is sold for agricultural limestone, but at a price which necessitates quantity and low cost handling. After more than a year of experimenting, the company adopted an 8-cu. yd. carryall (LeTourneau) scraper, and a 62 hp. tractor ("Caterpillar" RD7). The limestone, loading readily to heaping measure like sand, is hauled an average 500 ft. one way, 1000 ft. round trip, over negligible grades, in high gear. Dumping, ordinarily a rapid operation, is slowed only by the narrow conveyor belt upon which they load. In spite of this lack of storage and the slowing of the tonnage delivery, the application is highly successful, because equipment and operating costs are unusually low for this type of operation.

Sand to be used in steel molds and glass manufacture is relieved of its overburden by another similar combination of scraper (U-12 LeTourneau) and tractor ("Caterpillar" RD8) and bulldozer (LeTourneau) at the Berlin, N. J., operation of the Bridgetown Sand-Gravel Co. Overburden consisting of coarse sand and gravel is hauled 1200 ft. one way,

2400 ft. round trip, over 200 ft. of 6 percent adverse grade, the balance level, to be dumped at the edge of the excavation pit. On this operation, the carryall makes 7.5 trips an hour, to total 60 cu. yd. place excavation. The spoil is deposited at the edge of the cut; then when the usable sand has also been scraper-removed, the bulldozer-equipped tractor pushes the waste material back into the pit, making the entire cycle a one-man, one-machine operation.

Cement Packing

(Continued from page 37)

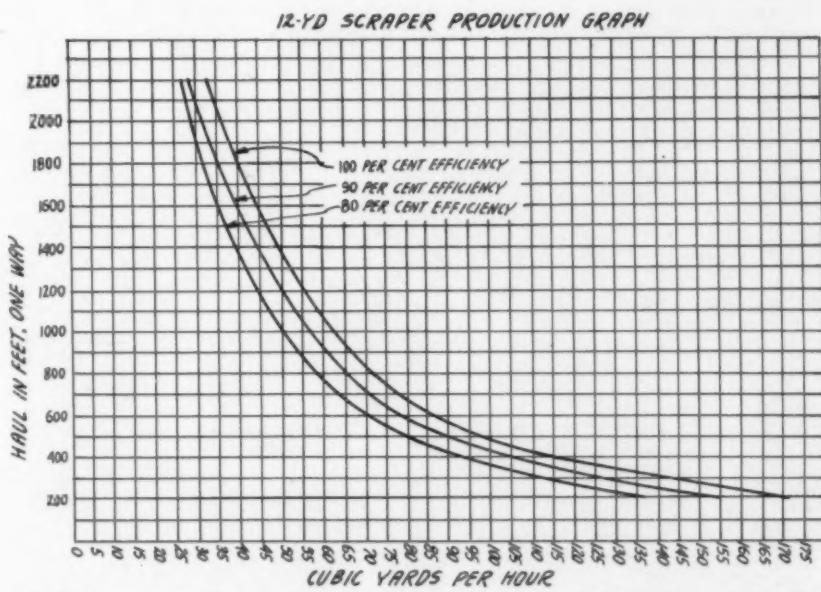
double-chain, bucket elevators. Capacity of each bucket elevator is 600 bbl. of cement per hour.

Cement discharged by the elevators is passed through enclosed circular screens, to remove foreign matter, and is then carried by the distribution screws to the loading stations. The side walls of these conveyors are incorporated into the beam-slab floor construction to help withstand beam stresses.

An interlocking motor-starting system was worked out so that no motor can be started until all motors driving equipment ahead of it are operating. In this way there is little likelihood of jamming the handling system. Similarly, if a conveyor or elevator is stopped, all equipment preceding the stopped machinery will automatically stop.

Cement is transferred from the older storage bins to the new loading-out stations by a 16-in. screw conveyor. The total storage capacity of the plant is now 360,000 bbl. and the loading-out capacity, when in full operation, is 1800 bbl. of cement per hour. Six new standard gauge railroad tracks were run to the new loading out stations.

JOSEPH T. RYERSON & SON, INC., Chicago, Ill., has announced a new plan that will aid steel users to secure more uniformly satisfactory results. The system, to be known as the "Ryerson Certified Steel Plan," undertakes to select whole heats of steel that have particularly desirable qualities, make thorough tests and give the user a report on the analysis, tests, etc. The plan is of particular value on the alloy steels that usually require heat treatment before use. This new plan is expected to solve many of the problems that have developed during the rapidly increasing use of alloys. Entire heats of alloy steels that come within certain narrow analysis limits are selected under the new plan. The steel is tested for chemical and heat treatment characteristics and complete data is prepared for delivery to every buyer of steel.



Production graph showing the efficiency of a 12 cu. yd. scraper working at various hauling distances

DANGER FROM FALLING ROCK



Fatal Accident In Quarry Caused By Driller's Failure to Follow Instructions In Working Beneath Rock Face Under Hazardous Wet Weather Conditions

QUARRYING is a relatively hazardous operation. While the cement plant quarries of the United States have a good safety record as compared with quarrying in general, they produce more accidents per million man-hours worked than do any of the mill departments.

A short time ago a fatal accident occurred in an eastern cement plant quarry which should provide a valuable object lesson. A large primary shot had dislodged a great deal of rock. As usual, there were many pieces too large to go into the crusher and these were being drilled and loaded for secondary shooting. These operations were proceeding close under the face by a gang of some seven or eight men being directed by the quarry foreman.

Wet weather always adds hazards to men working on secondary operations close to the quarry face, and a rain preceding this particular accident loosened rock, making walking difficult and adding to quarry difficulties. In view of these conditions the foreman made his inspection with unusual care but the wet weather made it impossible to get up to the face to bar it down. As the gang went to work two or more men watched the face constantly. Each workman had been reminded of the safe avenues of escape in case of falling rock.

One of the drillers, an extra man who had served several years as a quarry laborer, had just completed a hole and was moving his drill to a nearby rock when the lookouts sighted a large piece of rock, weighing some 1500 lb., break loose from a spot high up on the face, and start its rapid descent. Both men who saw the rock descending the steep incline shouted warnings which were heard by all of the workmen in the party. All of the men observed the rock and all except the one with the drill, referred to above, ran to secure locations and thus escaped injury.

The driller who did not run remained observing the rock until, apparently, he felt confident from the direction it was taking that it would pass him by with a safe margin. But hardly had the driller turned his attention from the approaching rock when it struck a well-anchored obstruction and, due to its speed, was diverted sharply in the direction of the

unfortunate man. The latter had turned his attention back to his drill, and apparently was entirely unaware of its approach until a moment before he was struck. At any rate he seemed to be trying to climb up on the rock he was about to drill when the flying rock struck and crushed him against the other. His body was crushed from the hips down and death ensued shortly.

In thus relying on his own judgment rather than following rules and instructions this driller made a grave mistake, for it not only cost him his life but it left the widow \$1000 with a payment of only 65 cents. He was 50 years of age and had been with his present employer 3 years.

Failure to Follow Instructions Causes Fatal Accident

Many quarrymen, even some of the most experienced, have been unable, seemingly, to realize the very great, ever-present danger of rock breaking loose from the face. Whether rocks may drop vertically or roll down an incline, fragments of almost any size or shape are capable of inflicting death or severe injuries. In many cases, of which the

present is a good instance, drillers have neglected to follow positive instructions to run to safety by way of pre-arranged escape routes. Any man's judgment may prove poor, for it is very difficult for anyone to predict where a rock may go under such circumstances. No quarryman should ever take his eyes off descending rock while it is above him.

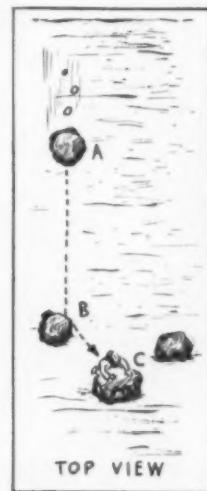
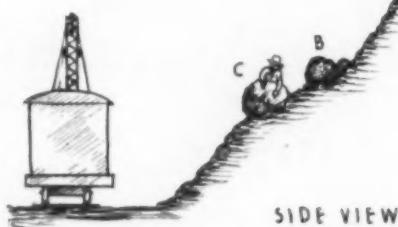
Since the foreman and his crew were satisfied that with careful handling operations would be safe, we have further evidence from this accident that even very competent men cannot always tell what is likely to happen at the quarry face. This is particularly true in wet weather.

Extra Precautions to Be Observed in Wet Weather

So there are two very obvious lessons to be learned from this distressing incident: First, perfect safety training and absolutely faultless safety discipline must be maintained at all times by groups working under the quarry face. The employer did not want this worker to remain in a place of danger. The latter exercised his own discretion by wantonly disobeying rules and instructions. But certainly the victim did not want to get hurt, much less lose his life. Evidently his training or discipline or both, were faulty. Isn't it possible that

(Continued on page 48)

(A)—Runaway stone from face; (B)—stone struck by A, which deflected latter from its natural course; (C)—stone which quarryman was about to drill when struck by stone (A)



ROCK PRODUCTS

Light Trucks Pulling Semi-Trailers

CUT QUARRY HAULING COSTS

By H. M. SHAW
Raleigh Granite Co.

DURING THE LATTER PART of 1935 we decided that we would need some new hauling equipment at our Rolesville quarry. Prices and specifications were secured on the conventional type trucks capable of carrying an 8-cu. yd. "Phoenix" type body. The prices on these were between \$7000 and \$8000. We had seen a good many Fords handling some pretty heavy loads on the highways with semi-trailers and did not see why something along this line could not be worked out that would give us a more economical operating truck, and one on which the original cost would be much lower.

Several trailer manufacturers were asked to submit designs and prices on semi-trailers to be pulled by Ford trucks, with a load distribution of from 60 percent to 70 percent on the trailer axles, to be equipped with 8-cu.-yd. Easton "Phoenix" type bodies, and specifying that the tire equipment should not be overloaded to any appreciable extent.

A design in which the subframe for the dump body was incorporated with the trailer frame and the conventional type springs were replaced by helical type springs was submitted by the Easton Car & Construction Co., of Easton, Penn. After making some

changes in the proposed design, an order was placed with this company for two semi-trailers equipped with 8-cu. yd. Phoenix type bodies, and an Easton patented dumping device equipped with a 14-in. diameter, 9-ft. stroke Curtis air cylinder.

Load Distribution

Semi-trailers were equipped with dual 12-ply, 10.50-x22-in. non-skid balloon tires; helical type springs, and a fifth wheel designed to transmit part of the dumping strain to the Ford truck. No brakes were used. The extension to the semi-trailer frame was designed to project over the truck chassis to protect the torque tube, the brake rods and the frame of the truck. This arrangement resulted in the following weight distribution:

	Front wheels lb.	Rear wheels lb.	Semi-trailer wheels lb.	Total weight
Truck	2700	1800		4500
Fifth wheel	45	455		500
Trailer	100	900	3500	4500
Body and load	970	8730	17300	27000
Total	3815	11885	20800	36500

These units were received and put in operation when operations were resumed in March after being shut down for the

winter. Two new Ford trucks were purchased, equipped with 7.00-x20-in. balloon front tires, 6:16 ratio rear ends, heavy duty water cooling systems, cabs, oil bath type air filters, and governors. Some special heavy helper springs were made to withstand the heavy loading and dumping strains.

These units, together with some old trucks that we had on hand, were used to take stone for a distance of approximately 400 ft. from the 50B Bucyrus-Erie electric and the 42B steam Bucyrus-Erie shovels, dumping their loads into a 48-x80-in. Traylor jaw crusher.

We checked several of the loads being hauled by these semi-trailer units with a loadometer. The weight distribution was as follows: front wheels, 3100 lb.; rear wheels, 11,550 lb.; and semi-trailer wheels, 21,000 lb., a total weight of

35,650 lb. and a distribution of 9 percent, 32 percent and 59 percent. When empty, the total weight was 18,600 lb. with the following weight distribution: front wheels, 2300 lb.; rear wheels, 7000 lb.; and semi-trailer wheels, 9300 lb.

After operating these units for about a month it was decided to purchase another unit with a 10-cu. yd. body, since the increased size of the body would permit easier loading even if we did not find it practical to carry any heavier load. From observation and due to the fact that these trucks were operated at low speeds it was considered necessary to increase the tire size on the truck or trailer. Moving the tires on the semi-trailer forward so that they would be protected from any stone falling off the rear of the truck allowed us to increase the load on the trailer without greatly increasing the load on the Ford truck. This unit was designed to have a load distribution as follows:

When these units were purchased we also bought a spare fifth wheel so that it could be installed on a standby truck to be used in case of trouble with one of



Light tractor-truck hauls stone in dump body, the subframe of which is incorporated with the semi-trailer frame. Conventional style springs were replaced with helical springs.

	Front wheels lb.	Rear wheels lb.	Semi-trailer wheels lb.	Total Weight
Truck	2700	1800		4500
Fifth wheel	75	750		825
Trailer	150	1350	4500	6000
Body	250	2300	4950	7500
Load	850	7650	16500	25000
Total	4025	13850	35950	53825
Tire sizes	7.00 x 20	37 x 7 Dual	10.50 x 22 Dual	
Tire capacity	3900	11200	20000	35100

the Fords. We have never used this fifth wheel or purchased the standby truck, since we have had so little trouble with these units. When these trucks were placed in operation we leveled off the quarry floor with crushed stone and screenings, and have kept this road up with a heavy timber drag which is pulled over the road once or twice a day.

Heretofore, solid tired trucks have always been used, but we have found that with semi-trailers and pneumatic tires very little if any more trouble is experienced in keeping the road up, and the pneumatic tires last much longer than the solid tires. The only major repair work which has been done to any of these units has been to replace one of the rear ends. The rear end assembly was removed and taken to a nearby Ford dealer who had the parts in stock, and in a few hours the unit was back in operation. No repair parts for these units are carried in stock as they are readily available at any Ford dealer's garage. Since three sizes of tires are used we bought a spare of each size and no other tire equipment has been purchased in the two seasons of operation, and it is believed that these tires will last us two or three seasons more. By having the tires of ample size, we have not shortened their life by overloading them.

Advantages With This Equipment

The power costs have been low, the units using less than a gallon of gas per hour. Having small bore, high speed motors, the gas consumed while idling is comparatively low, and these truck motors are idling from 50 to 75 percent of the time. The oil is changed after every 60 hours of operation and very little

make-up oil is required. The trucks are equipped with starters so that the motors may be cut off in case of delays.

As these trucks are equipped with cabs and self starters, they are more convenient and comfortable, and with the fifth wheel placed only 12 in. ahead of the rear axle, a good part of the road shock is not transmitted to the driver. The steering is easy since very little of the load is on the front axle. The driver is in a safer position, due to the load being a considerable distance back of the cab.

Centenary

UTICA HYDRAULIC CEMENT Co., Utica, Ill., celebrated its 100th anniversary in January—claims to be the oldest, continuously operated cement manufacturing organization in the United States. The deposit of natural cement rock was discovered by an Englishman, James Clark, who saw the possibilities of making a hydraulic cement for use in constructing the locks for the Illinois and Michigan canal. The rock was burned in hillside pot kilns, and the clinker ground with buhr stones. Actually, production began on a small scale in 1830, but there were numerous interruptions until 1838; since then production has been continuous year after year. Mr. Clark died in 1888. The business continued under his name for 20 years, when the Utica Hydraulic Cement Co. was chartered. Ownership passed out of the Clark family in 1918. The plant was rebuilt after a fire in 1924, but still employs shaft kilns. Its present capacity is 2000 bbl. per day. Frank Dettlebach, La Salle, Ill., is the company's president. James Sinden of Utica, who, incidentally,

has been with the firm more than half a century, is the general manager. R. F. Dettlebach, La Salle, is plant superintendent; George Anderson, Lansing, Mich., vice-president; S. M. Spillane, Ottawa, Ill., secretary; S. G. Seaton, La Salle, chief chemist, and Thomas Burton, Chicago, sales manager. The company's Chicago offices are located in the Builders' building and there are scores of distributors in all of the central states.

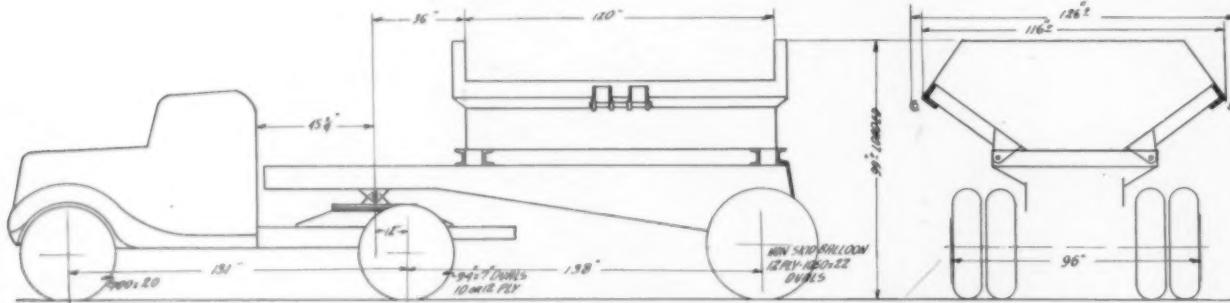
Fatal Accident

(Continued from page 46)

his supervisors had failed to impress him sufficiently as well as to maintain safety discipline? Safety rules and instructions must be understood and obeyed or they are utterly valueless.

Second, wet weather should automatically add further precautions. In very dangerous surroundings it may be advisable to suspend secondary drilling and loading unless they can be done at a safe distance from the face. Many bad accidents to men and expensive repairs to equipment could be avoided every year by suspending operations during wet periods, remaining away until the face can be carefully barred down, dressed with shovel and normal, relatively safe conditions restored. In many quarries wet weather not only means loose rock but it usually means slippery and insecure foothold and greater difficulty in making escape in emergency.

A safe and sure way to conduct secondary drilling and shooting, so far as face hazards are concerned, is to remove all rocks to be drilled a safe distance from the face. In many circumstances the use of a little more explosive during seasons of the year when wet weather is encountered would throw the rock farther from the face and in that way avoid the zone of probable danger. In any event, it is insufficient to let quarrymen work in a place where, should danger come upon them, they are entirely dependent on whether or not they choose to obey safety rules and instructions.



Elevation and end views of dump body for hauling rock, mounted on semi-trailer hauled by light weight tractor-truck unit. Rock is dumped by means of a patented dumping device equipped with a 14-in. diameter, 9-ft. stroke air cylinder

Some of the Highlights of the CRUSHED STONE CONVENTION

THE TWENTY-FIRST ANNUAL CONVENTION of the National Crushed Stone Association, held January 24, 25 and 26 in Cincinnati, Ohio, had an attendance of about 300, divided equally between producers and equipment manufacturers' representatives.

A feature of the year's convention was the machinery exposition, one of the finest and most complete in recent years. Attendance by producers at the exposition was exceptionally good, and there were a number of new developments in equipment for them to see.

Much of the success of the exposition was due to the close co-operation between the association officials and those of the manufacturers' association who planned the program so that ample time was set aside for the purpose of inspecting the machinery. Many of the exhibits remained on the floor for inspection by sand and gravel and ready-mixed concrete producers who held their annual conventions the following week.

A contest was conducted at the booth of the Cross Engineering Co., Carbon-dale, Penn., to determine the winner of a handsome chair made from perforated plate. R. P. Immel, American Limestone Co., Knoxville, Tenn., was announced as the winner of the prize at the cabaret when the convention was over.

In addition to the business sessions and machinery exposition, arrangements were made for luncheons, dinners and a banquet and cabaret to which all were invited to attend and enjoy the best in entertainment. Speakers of national reputation were engaged to address the producers at these affairs on subjects of widespread interest.

The Washington Outlook

At the "greeting luncheon" on Monday, Pyke Johnson, vice-president and Washington Representative, Automobile Manufacturers' Association, Washington, D. C., addressed the group on "The Washington Outlook as It Affects Industry." Mr. Johnson discussed the various measures now pending in Congress and their possible effects on the operations of the crushed stone industry. Among the measures he commented on were wage and hours legislation, the Federal licensing bill, and the proposed modification of the present tax law.

OTHER important Papers and Addresses presented at the Convention will be printed in the March issue of *ROCK PRODUCTS*.

In Mr. Johnson's opinion the wage-hour legislation now held in committee is not likely to be as drastic as previous measures on the subject, and will be more directed toward the submarginal or starvation wages paid by some concerns.

Commenting on the tax bill legislation concerning undistributed profits, he said that there are indications of a return in part to conservatism.

On Monday evening, producers and guests to the convention were all invited to an informal reception by the Manufacturers' Division of the National Crushed Stone Association. The reception was followed by a buffet supper, and later by the formal opening of the Manufacturers' Division Exposition.

Tuesday evening was set for the annual banquet, which has long been a highlight of the Association's meetings. This being the twentieth anniversary of the founding of the National Crushed Stone Association, Chairman Otho M. Graves very appropriately traced the development of the Association from its beginning in 1917. In its early history, crushed stone producers were only organized in small state associations and it was due to efforts of some of these men and partly to the suggestion of *ROCK PRODUCTS* that the national association was formed, said Mr. Graves.

"Industry and Public Policy" was the subject of the feature address of the evening by James A. Emery, General Counsel, National Association of Manufacturers, Washington, D. C., who ranks as one of the nation's most prominent after-dinner speakers. And incidentally the industry was honored by having one of its members, Mr. Graves, chosen as a member of the National Association of Manufacturers.

The second speaker was Major Eric Vonder Heide, of Vienna and New York, whose address was on "Humanities in Labor Relations". Major Heide is a distinguished authority in this field in Europe as well as in the United States. His address bespoke his wide

sense of human understanding and was presented in a most humorous vein.

Safety Contest Winner

At one of the business sessions, devoted to the subject of safety and occupational diseases, the *Explosives Engineer* trophy was awarded to E. A. Heise, Safety Engineer, Columbia Quarry Co., St. Louis, Mo., as the winner of the annual safety contest conducted by the U. S. Bureau of Mines for the year 1936. The Columbia, Ill., plant of this company has now operated about 1,000,000 man-hours without a single lost time accident. A number of certificate awards were presented to other concerns which had outstanding safety records for the year.

When all business sessions were concluded, an evening was devoted to entertainment in the form of a convention cabaret.

A floor show was provided and an orchestra for those who wished to dance. A very interesting three-day program of entertainment was arranged for the ladies, while the members were holding their business sessions.

The business meetings themselves were well attended, featured speakers were of national importance, and an opportunity for all was presented to participate in open discussion. The papers of particular significance to producers of crushed stone will be published in the March issue of *Rock Products*.

Business Conditions in the Industry

Following the address of welcome by President H. E. Rodes, the regional vice-presidents were called upon to report on business conditions in 1937 and to forecast the business outlook for 1938 in their respective regions. Reports on 1937 conditions were at best inconsistent and varied from increases as high as 25 percent to decreases of as much as 30 percent within the limits of a single region.

For the eastern region, A. L. Worthen, New Haven, Conn., reported that business conditions were variable and that it was difficult to arrive at an accurate figure. His estimate was a 10 to 15 percent increase in business during 1937 for the southern New England States with prices fair and steady.

In Boston, Mr. Worthen said prices

were unstable and he estimated that in New York and Pennsylvania tonnages and prices had declined 10 percent. Production in New England was estimated at 50 percent of capacity. For 1938, conditions were expected to be at the same level, although lower prices are anticipated. In Pennsylvania sand and gravel and slag are being used practically exclusively for road maintenance, and according to Mr. Worthen there had been considerable diversion of motor vehicle and gasoline taxes.

In the central region, J. A. Rigg, Fort Spring, W. Va., said that in 1937 there were increases of up to 25 percent in volume of business in the cases of some operators and that others had experienced declines of up to 30 percent. The average over the region was estimated at an increase of 10 percent. Prices remained the same in 1937 as 1936, but owing to higher production costs there had been less profit made. Volume of production represented about 50 percent of capacity and a few plants had operated over the year at full capacity.

Of the total output in this region, 51 percent went into the construction of highways, 12 percent for railroad ballast, 7 percent for building construction, 19 percent for chemical and metallurgical use, 4 percent was used for agricultural purposes and 7 percent was sold for miscellaneous purposes. Mr. Rigg, in reporting, said that his figures were based on reports submitted to him by such a small number of concerns that his figures might not strike a fair average.

For 1938, in the central region, it is estimated that highway construction will be about the same as in 1937. It is anticipated that the volume of ballast sold will be greater and that demands for agricultural limestone will increase. Declines are expected in general building and in the production to be used for chemical and metallurgical purposes. No increase in prices for 1938 is expected in this region.

N. E. Kelb, Indianapolis, Ind., reporting on conditions in Indiana, Missouri, Illinois, Iowa and Wisconsin, said that the 1937 volume of business was about equal to that of 1936, that lower prices had been reported to him by some producers and that others had had price increases. The price level averaged the same as that in 1936, but profits had been cut due to increases in production costs. Volume of production was about 50 percent of capacity. Mr. Kelb said that in Missouri, Iowa and Wisconsin considerable business had been lost due to government competition. Highway construction and railroad ballast took from 15 to 70 percent of production and agricultural limestone represented from no tonnage up to 30 percent of production.

He said that business prospects for 1938 were uncertain but that he anticipated a slightly lower volume of business than in 1937.

In the southern region, the 1937 volume of business increased as compared to 1936. T. I. Weston, Columbia, S. C., in his report stated that Tennessee producers had increases of 10 to 18 percent in their volume of business, that there was an increase of 15 percent in North Carolina and that South Carolina and Georgia producers had about the same tonnage as in 1936. The price level was lower, dropping off as much as 8 percent in some instances. Production represented 50 percent of plant capacity in these states.

The distribution of 1937 tonnage varied considerably. In Tennessee 20 to 30 percent of the stone produced was used in the construction of highways, 40 to 50 percent was sold to the railroads for ballast, agricultural limestone was 20 to 30 percent of the output and from 5 to 10 percent was used for miscellaneous purposes. In North Carolina, South Carolina and Georgia, 60 to 80 percent of the tonnage was used in highway construction, 10 to 25 percent was railroad ballast and 5 to 15 percent went into miscellaneous building. Sales in 1938 are expected to decline slightly, with about the same distribution as to usage.

In the southwest there was a decline in volume of business in 1937, said E. O. Eikel, New Braunfels, Tex., and prices were lower. Consumption represented 30 percent of capacity. The distribution of the output was 65 percent for highway construction, 25 percent railroad ballast, 4 percent for building, 5 percent for chemical and metallurgical usage and 1 percent agricultural limestone. A further decline in business is anticipated in 1938 with the same approximate distribution. Competition from roadside plants is increasing due to higher freight rates.

J. R. Boyd, administrator director of the Association, read the report for the western region in the absence of A. P. Wilson. In northern California, the volume of business forecast for 1938 was expected to equal that for 1937. A greater volume is anticipated in the San Francisco area in connection with construction for the 1939 Golden Gate International Exposition.

Election of Officers

T. I. Weston, Columbia, S. C., was elected president of the Association for the coming year to succeed H. E. Rodes of Nashville, Tenn. W. T. Ragland, Raleigh, N. C., succeeds Mr. Weston as the regional vice-president for the southern region.

Chairman of the executive committee is Mr. Weston, and other new members

are N. E. Kelb, Indianapolis, Ind., and H. E. Rodes.

Mr. Weston is, of course, chairman of the new board of directors of the Association. Other new members are H. E. Rodes and H. A. Johann, Frog Switch and Manufacturing Co., St. Louis, Mo., representing the Manufacturers' Division of the Association.

At the annual meeting of the Board of Directors, Manufacturers' Division, H. A. Johann was elected president to succeed M. S. Lambert, Robins Conveying Belt Co., Chicago, Ill. E. J. Goes, Koehring Co., Milwaukee, Wis., succeeds C. W. Swanson, Illinois Powder Manufacturing Co., St. Louis, Mo., deceased. J. Barab, Hercules Powder Co., Wilmington, Dela., was chosen to replace Mr. Johann as vice-chairman of the Manufacturers' Division. The resolutions committee expressed appreciation, in the form of a letter, to the president of the National Crushed Stone Association for his efforts and those of the group in making the machinery exposition a success. Another resolution was passed to send a letter of sympathy to the family of C. Swanson, deceased, and to the Illinois Powder Co.

Administrative Secretary J. R. Boyd, and Engineering Director, A. T. Goldbeck, in their reports to the members of the National Crushed Stone Association revealed that much progress had taken place in 1937 in regard to administering the affairs of the Association and in furthering research.

CECIL BAKER AND WINTHROP BRYAN, both of Red Wing, Minn., have opened up the quarry on the L. E. Young farm, northeast of Wastedo. Finely ground limestone for agricultural purposes will be the principal product. Crushing was started early in December, and deliveries are now being made to farmers.

MARQUETTE CEMENT MANUFACTURING Co., Chicago, Ill., according to Cape Girardeau, Mo., newspapers, paid a Christmas bonus of two weeks' pay, with a minimum of \$50 for those with over six months' service and \$25 to those with less than six months' service.

ROLL MANUFACTURING Co., Cleveland, Ohio, makers of dry colors for the cement and plaster industry, will move its plant from Cleveland to the old Zion City crusher plant of the Kelley Island Lime & Transport Co., two miles southwest of Lakeside, Ohio. Unused for many years, the old crusher is being rebuilt and new equipment installed in preparation for the opening of the plant about February 15. F. E. Miller of Cleveland is president and general manager, and J. A. Taylor is plant superintendent.

Road Show at Cleveland Draws Good Attendance

AMERICAN ROAD BUILDERS' ASSOCIATION held one of the most interesting conventions and Road Show Exhibits at the huge Cleveland Auditorium, January 17 to 21. More than \$10,000,000 worth of road-building equipment was on display.

The convention went on record as opposed to any reduction in federal aid to highways as well as to any change in the procedure by which these funds are administered. It was pointed out that the federal government has collected from highway users \$194,000,000 more than it has expended in federal appropriations for highway improvements. The association adopted a resolution urging Congress to continue federal aid authorizations on at least the present level, as provided by the Hayden-Cartwright Act.

Diversion of the money collected by the states in special taxes on the motorist to non-highway purposes was also strongly condemned. A plan of action was agreed upon to prevent diversion of motor revenues by constitutional amendments in those states where this has not already been carried out.

Other resolutions adopted by the convention included endorsement of federal aid to municipalities, the funds to be used on those main arteries which connect federal and state highways; a recommendation that all counties, whenever possible, make use of federal aid for secondary roads; an endorsement of the contract system for all highway construction; and a decision to work for the early formulation of sound, long range highway programs by the state highway departments or state highway planning commissions, and the early adoption of enabling legislation which will place the plans in effect.

New Officers

Murray D. Van Wagoner, Michigan State Highway Commissioner, Lansing, Mich., is the new president of the American Road Builders' Association. He succeeds Col. Willard T. Chevalier, vice president of the McGraw-Hill Publishing Co., New York City. Other officers elected included: Paul B. Reinhold, secretary-treasurer of Reinhold and Co., Pittsburgh, Penn., vice-president, northeastern district; E. D. Kenna, director of the Mississippi State Highway Department, Jackson, vice-president, southern district; Lion Gardiner, vice-president of the Jaeger Machine Co., Columbus, Ohio, vice-president, central district; Stanley Abel, supervisor of the fourth district, Kern county, Taft, Calif., vice-president, western district and

James H. MacDonald, consulting road and paving expert, New Haven, Conn., treasurer.

A.R.B.A. directors for the next two years will be A. W. Brandt, commissioner of highways, department of public works, Albany, N. Y.; Carl W. Brown, chief engineer, Missouri State Highway Department, Jefferson City; Frederick Hoitt, secretary, New England Road Builders' Association, Boston, Mass.; C. J. Sherlock, first assistant engineer, Alabama Department of Highways, Montgomery; Charles M. Upham, engineer-director of the A.R.B.A., Washington, D. C.; Charles D. Vail, state highway engineer, Denver, Colo., and H. C. Whitehurst, director of highways, Washington, D. C.

Thousands of Cement Workers on Safety Honor Roll

More than 35,000 cement workers, employes in the 152 mills and quarries within the membership of the Portland Cement Association, have just received annual honor roll cards certifying to a safe working record during 1937 and, in some cases, several previous years as well. More than 5,000 have just received the handsome 25-year certificate just issued by the Association for the safety veterans of the industry.

Workers who have a safe record extending back of January 1, 1937 were presented with silver finished cards specifying the exact length of their accident-free employment for their present employers. These cards are very highly prized and are recognized at once anywhere in the cement industry.

New workers who joined the ranks during the 1937 operating season and workers whose current safe record starts with 1937 are entitled to a similar silver card of a type which the Association issues annually. It, too, is highly prized as a recommendation for competence and trustworthy performance.

The Silver Anniversary Honor Roll Certificate, awarded to veterans of the industry with 25 years or more of service, is the most coveted personal recognition awarded by the industry. It is reproduced from a hand-lettered certificate bearing the signature of the president of the Association and Chairman of its Committee on Accident Prevention and Insurance and broad silver stripes across top and bottom, symbolical of the Silver Anniversary of organized safety work in the cement industry.

Celotex Acquires Interest In Certain-Teed Products

CELOTEX CORP., Chicago, Ill., has acquired a substantial interest in Certain-teed Products Corp. At present Celotex products are largely confined to insulating and acoustical correction materials, manufactured principally from a base of sugar cane fiber. Acquisition of the Certain-teed stock will give Celotex access to facilities for the manufacture of gypsum and plaster, roofing linoleum, and floor coverings. No merger of physical properties is contemplated for the present. During the past year, the Celotex Corp., also acquired a majority stock interest in the American Gypsum Co.

New Equipment

OREGON LIME PRODUCTS CO., Grants Pass., Ore., has purchased and is installing a \$20,000 Kuntz hydrating plant.

ANDERSON AND DUNHAM CO., Oklahoma City, Okla., has announced the completion of a new ready mix concrete plant at Baton Rouge, La., costing \$115,000. It is the first of three such plants under consideration by this company which has several plants in the country.

KANSAS SAND CO., Topeka, Kan., has placed orders for six Rex Transit mixers. A pre-mixing plant is in operation at the company yard, and by the use of the pre-mix and completion of the process while it is in transit a much better grade of concrete is said to be produced. Fred and Otto Kuehne, Jr., are owners of the Kansas Sand Co.

VICTORY SAND AND STONE CO., Topeka, Kan., contemplates the eventual purchase of seven trucks to provide ready-mix concrete. Prior to the recent purchase of special equipment for mixing in transit, the concrete was delivered in trucks equipped with dump bodies.

Practical Handbook for Plant Operators

PIONEER ENGINEERING WORKS, INC., Minneapolis, Minn., has published "Facts and Figures," a pocket size handbook containing a number of facts and figures used daily by producers of rock products. Information includes the requirements for coarse and small size aggregates, data on belt conveyors, equivalent sizes of round and square openings, power requirements for screens and other equipment, weights of materials, percentages of aggregate sizes from crusher settings, weights and measures, water requirements for washing aggregates, determinations of pulley diameters and other practical information too voluminous to mention here.

Chemists' Corner

Selecting the Proper Refractory For HOT ZONE LININGS OF KILNS

By C. H. SONNTAG

Plant Manager, Lawrence Portland
Cement Co., Thomaston, Maine

SOME METHODS AND PRODUCTS require trial for more than a single year to permit correct evaluation. Among these are refractories, for their life is comparatively long, and more than one run should be made with a new refractory before final judgment is passed upon it.

The rock products industry covers, among others, cement and lime manufacture. Both are large users of refractories.

Cement manufacture has been going through a transition stage in the past few years. The temperature in a cement kiln is always high, but in the past it was possible for some mills blessed with an almost perfect natural raw mix to burn more lightly than others not so favored. That time is past, and probably never will return. The demand for high early strength, which usually means high lime and more care in burning, has brought about higher kiln temperatures and, in some cases, longer burning zones. Naturally the conditions under which the kiln lining must do its work have become progressively more severe. It follows that selection of a suitable kiln lining for the hot zone has become of increasingly greater importance, but the intermittent operation of kilns that has been necessary in the past few years has not permitted the linings to give the best service of which they are capable.

Hot Zone Lining Refractory Should Be Basic

The principal reason why a hot zone lining fails is the fluxing action occurring between the clinker and the lining. The subject of the action of clinker on refractories has been discussed in detail elsewhere,¹ but it may be stated here that since clinker is chemically basic, it should, while at its temperature of formation, be in contact with a basic refractory.

Thought along this line brought a realization that fire-clay brick are not basic, though they have been used as hot zone liners by the million. The logical thing to do was to use a more basic refractory, and 70 percent alumina

brick, being commercially available, were adopted and are still used in large quantities. The better service they give justifies their higher price, and where conditions are not too severe, this class of hot zone lining will give very good satisfaction.

There are cement mills in which even 70 percent alumina brick have a comparatively short life. This condition is apt to be found in plants whose raw mix is made from a quite pure limestone and clay or shale. Such mills must practice fine raw grinding and very thorough burning in order to get a sound product with reasonably high early strength. Manufacturers faced with such conditions would naturally desire to use a still more basic lining.

The only commercially available truly basic lining is one consisting essentially of magnesite. Such brick were first offered as kiln linings, so far as the writer knows, about seven years ago. Their use in the first rotary cement kiln in which they were tried showed that their life exceeded by over seven times that of the 70 percent alumina brick that had been previously used, and they gave a very marked saving in lining expense in spite of their higher first cost. Many other cement mills, some in foreign countries, have since adopted them. They are also in use in rotary kilns burning dolomite, in which the temperature is higher than it is in cement kilns.

Study Transition Zone By Petrographic Methods

It is natural to wish to know the cause back of the observed excellent performance of magnesite brick, and much work has been done on this point² through studying by petrographic methods the transition zone between brick and clinker. It has been shown that in the case of 70 percent alumina brick, this transition zone is about an inch thick, and shows a progressive change from the unaltered brick to the clinker. In this zone there has been found a layer which has a melting point of about 300 deg. F. below the usual operating tem-

perature of a cement kiln, and the only reasons why this layer remains solid are the protection afforded by the coating and heat conduction outward through the brick and kiln shell. A similar layer would doubtless be formed between clinker and fire-clay brick.

No such reaction zone is found between clinker and magnesite brick. The change from clinker to brick is abrupt, and there is little evidence of chemical action between them. No layer has been found whose fusion point is not far higher than the operating temperature of the kiln.

The tonnage of burned dolomite produced annually is not large compared to the output of cement, but conditions in dolomite kilns are more severe than in cement kilns because of the higher operating temperature. For this very reason magnesite brick have shown greater endurance and economy when compared to the older refractories than they have in cement kilns.

Lime burning in vertical kilns has in many instances made little progress in the past 40 years. It is true that the temperature in a lime kiln is not as high as it is in a cement kiln, but it is also true that in lime kilns with outside furnaces, the highest temperature is at the top of the furnace arches where the lime and refractory are in contact. If the temperature should inadvertently become too high at this point chemical action between the lime and any of the older refractories is bound to occur, with the formation of an easily fusible slag that may sometimes be seen dripping down from the top of the arch, though it probably comes from the lining of the kiln just above the arch. Here there is no protective coating on the brick as there is in a cement kiln, so that the downward movement of the lime scours off the softened face of the brick. This action should not be in evidence in internally fired vertical kilns such as have been advocated and have come into use to a considerable extent.³

The reasons that call for a basic re-

fractory in cement kilns apply with even greater force to vertical lime kilns, and particularly to those of the externally fired type. The writer has tried 70 percent alumina brick, but his experience has been that they do not give as good service as silica brick, even though it must be admitted that silica is a strongly acid substance at elevated temperatures. But the lack of slag formation in a lime kiln is only one of the things that decide the choice of a refractory. Spalling resistance is another, but probably the most important is the ability to withstand the abrasive action of the lime as it moves down the kiln.

Lime burning has not been reduced to an almost uniform practice, as it has in cement burning. Some limestone is pure, while some tends to over-burn and even sinter. Some kilns are externally fired, others internally. Some burn high-calcium stone, others almost pure dolomite. Some are stuck, while in others the burden moves continuously or at quite short intervals. In some, life of lining is an important element of production cost, while in others it is less vital.

The writer knows of no instance in which the hottest part of a lime kiln has been lined with a truly basic refractory. The only way to find out whether the basic bricks now on the market are suitable for use in lime kilns, when both first cost and comparative life are considered, is to try them. The hope is expressed that such a trial will be made by someone in the near future.

¹ ROCK PRODUCTS, Nov. 5, 1932; Dec. 1934.

² R. P. Heuer, ROCK PRODUCTS, Dec., 1934.

³ Victor J. Azbe, in various papers in ROCK PRODUCTS.

Sand and Gravel Expansion

WESTERN SAND AND GRAVEL CO., Spring Valley, Ill., has completed the construction of a new garage, implement and material shed at the western edge of the city. The new building, which will house company machinery and shops, will be 60 ft. long, 40 ft. wide, and 15 ft. high. These new facilities were required to service the rapid expansion in this company's operations during the past several years.

THE GEORGIA GRAVEL CO., Columbus, Ga., has been placed in bankruptcy by creditors, according to newspaper reports. It is alleged that the defendant company owes debts in excess of \$1000 and is insolvent. An unsuccessful attempt to settle the matter out of court brought out that the company's assets totaled about \$25,000 and its liabilities were 28,000. The principal item in the assets is equipment valued at \$19,000.

Recent European Research In Cements

By DR. GABRIEL A. ASHKENAZI

Consulting Chemist, New York City

IT WAS ESTABLISHED long ago that the different sized particles of a given portland cement show different chemical composition, thus proving that portland cement presents not only a heterogeneous system of several compounds, but also that these compounds are distributed unequally with respect to the size of cement particles. This phenomenon attracted the attention of many investigators. Among others S. Rordam, and then E. T. Carlson and P. H. Bates published their investigations in the pages of this journal.¹ About one year ago J. Arthur Swenson and E. Flint of the Federal Bureau of Standards presented a detailed and diligent analysis about this subject.^{2,3}

Japanese Research

Recently the Research Laboratory of the Japanese Chichibu Cement Co., Ltd., published in the German paper (Zement, 1937, No. 34, p. 531-539) a very interesting and comprehensive investigation made by Dr. K. Koyanagi, S. Kato and T. Sudoh. In the previous investigations, in order to separate the cement flour into different fractions, a method of air elutriation was used. The Japanese experts, however, separated the cement grains according to their specific gravity, by means of suspension in heavy liquids of specific gravity ranging from 3.15 to 3.31. Five different types of cement were prepared: namely, a "low heat", a Kuehl, a Brownmillerit, a high alumina and a high lime cement. The chemical composition of these cements, expressed in terms of computed compounds according to R. H. Bogue, was as shown in the table below:

By means of suspension, several fractions of different specific gravity were separated and examined. The results obtained showed:

(1) The greater the specific gravity of the cement fraction, the larger the proportion of Al_2O_3 , Fe_2O_3 and MgO , the smaller the content of SiO_2 and CaO .

(2) Along with the increasing specific gravity of the cement fractions, the proportion of computed C_4AF in all

types of cement increases and the proportion of C_3S decreases. The content of C_2S in the fractions of Kuehl's, high alumina and high lime cement types rises when the specific gravity increases; the "low heat" and Brownmillerit types show, however, a reverse picture.

(3) Examination of the size of granulation in connection with the specific gravity shows the assumption that the cement grains, disregarding their size, possess the same specific gravity is not correct, provided the specific gravity of cement clinker is equal to 3.24, or higher. This fact is of importance and must be taken into consideration by the determination of granular composition of cement by means of air separation or sedimentation, which methods are based on the postulation that different sized cement grains have the same specific gravity.

X-Ray Tests

(4) The X-ray tests proved that the fractions of lowest specific gravity show the diagram of C_3S , for all five types of cement. The X-ray pictures of the heavy fractions, however, were altogether different from the light ones. Diagrams of high alumina and high lime types showed an almost perfect conformity with dicalcium-silicate, while in the diagrams of "low heat" and Brownmillerit types the lines of both calcium-silicate were found together. It is remarkable, that the lightest fraction of "low heat" cement (specific gravity 3.19-3.23), containing, according to Bogue's method of computation, nearly twice as much C_2S and C_3S , should give distinct lines of dicalcium-silicate. According to this investigation, the diagram did not show these lines at all.

In all fractions of Kuehl, Brownmillerit and "low heat" cements, the lines of C_4AF were distinctly seen. The existence of C_3A whether in heavier, or in the light fractions of all types could not be sufficiently proved.

¹Rock Products: July and October, 1932.
²Nat. Bur. of Stand. R. P. 910. August, 1936.

Type of cement	C_4AF	C_3A	C_2S	C_3S	MgO	Free Fe_2O_3
Low heat	19.0	3.6	28.7	47.3	1.3%	—
Kuehl's	20.6	4.1	72.6	1.5	1.2%	—
Brownmillerit	12.0	—	63.3	18.3	1.4%	0.9%
High alumina	8.8	14.8	51.3	23.6	1.5%	—
High lime	6.9	12.6	73.3	5.8	1.4%	—

HINTS AND HELPS FOR SUPERINTENDENTS

Eliminate Static Electricity from Belt Drive

By A. M. TURNER

Three Forks Portland Cement Co.,
Hanover, Mont.

THIS SUGGESTION is possibly of little value to larger plants which maintain an electrical department, but may prove of particular value to smaller plants which operate only a few motors and don't employ the services of an electrician.

The accompanying illustration shows a 150-hp. motor driving a 20-in. leather belt. Directly above the lower loop of the belt, two short pieces of chain are suspended from a strip of iron which is anchored to the side of the building. To the anchored end of this iron is fastened a piece of copper wire which leads to a rod that is driven into the ground.

Static electricity, which is developed on any high speed belt, may be picked up by this device (or any one of numerous modifications that can be used), and is carried into the ground. This installation will eliminate the possibility of the static being carried to the motor where it may burn through the insulation of the windings and damage the motor. There is also a personal safety factor accomplished by this plan as the static from the belt could shock a person and cause him to fall or jump into nearby machinery. This method of eliminating static electricity is simple to install.



Eliminate static electricity from belt drive by improvised ground, using chains

Contest Awards

PRIZES have been awarded by the judges in ROCK PRODUCTS Annual Contest to the following:

First Prize to E. L. Shoemaker, chief engineer, Warner Co., Philadelphia, Penn., for his article appearing on page 41 of this issue of ROCK PRODUCTS, entitled, "New Sand and Gravel Transport of Unusual Design—All-Steel Tug and Five Barges".

Second Prize to C. O. Granger, superintendent, Chas. H. Young Co., St. Paul, Minn. His article, which was published in the January issue, was on the subject, "Car Spotting Equipment Saves Labor".

Third Prize to John S. Dunning, Atlas Sand, Gravel and Stone Co., Hartford, Conn., for his article in the January issue on "Solving a Sand Dewatering Problem".

Fourth Prize to A. M. Turner, Three Forks Portland Cement Co., Hanover, Mont. His article, appearing in this issue, is entitled, "Eliminate Static Electricity from Belt Drive."

Fifth Prize awarded to Ivor Ramm, Southard, Okla., for his article, "A Home-Made Drifter", which appeared in the January issue.

Checking Soundness of Cement Pat

By M. MIWA,
Toyama Cement Co., Japan

A COMPARATIVELY SIMPLE but exact method of checking the soundness of a cement pat is described, herewith. The procedure is as follows: After thoroughly boiling the cement pats, take them out one at a time and observe the wet surface of the pats while they are drying. If the shrinkage results in the pats taking an irregular curve or if the lines form a network design or are knicked lines, the pat may be said to be unsound. However, if the pat in shrinking assumes a regular curve at

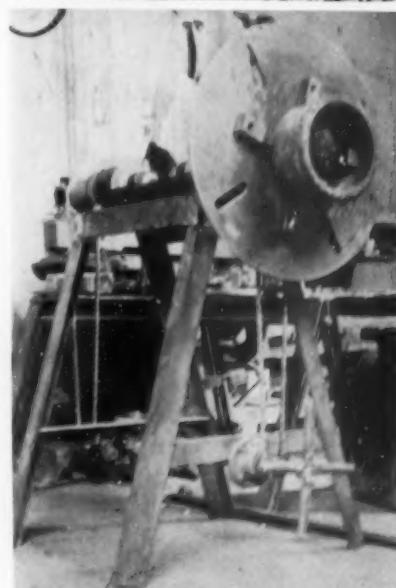
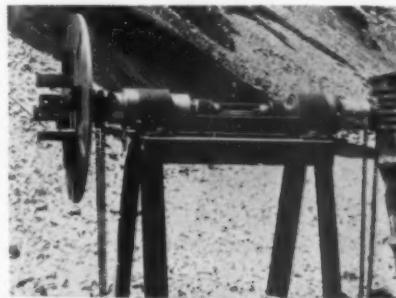
the edges the cement may be considered sound.

This check on the soundness of cement is quickly and easily made. No particular skill or experience is needed compared with other methods which require examination under a microscope or by listening to the sound when the pat is struck. If the pat has been boiled and then dried, the test may be made if the boiling is repeated and the observations described above are carried out.

Water Needle Repair Jig

By WALTER B. LENHART,
Bishop Creek, Calif.

A COMMON REPAIR necessary to a rock drill is the replacement of broken water needles. Where several drills are in service, the cost of the



Above: Special jig, consisting of two drill chucks mounted in a frame, used in making rock drill repairs. Below: End view of jig showing pedal and chain drive arrangement

needles becomes an item not to be ignored.

One user of rock drills made a jig in their own shops so that broken needles could be repaired. In making this repair, the broken end is cut off and either a piece of tubing welded on the broken stub or a piece of tubing cut from a second broken needle is welded on to the stub. To do this properly, the trick is to have the two needle stubs accurately centered, and this is accomplished in the jig by means of two small drill-bit chucks mounted in a frame, the chucks having lateral adjustments so any length of tubing up to 18-in. can be accommodated. A peddle, foot operated, not unlike an ordinary bicycle peddle, turns the needle at the operator's will, who, at the same time, brazes the two stubs together.

The operator becomes used to the welding so that he can make the bronze literally "flow" around the tube being welded. After brazing, the joint is smoothed down with a file.

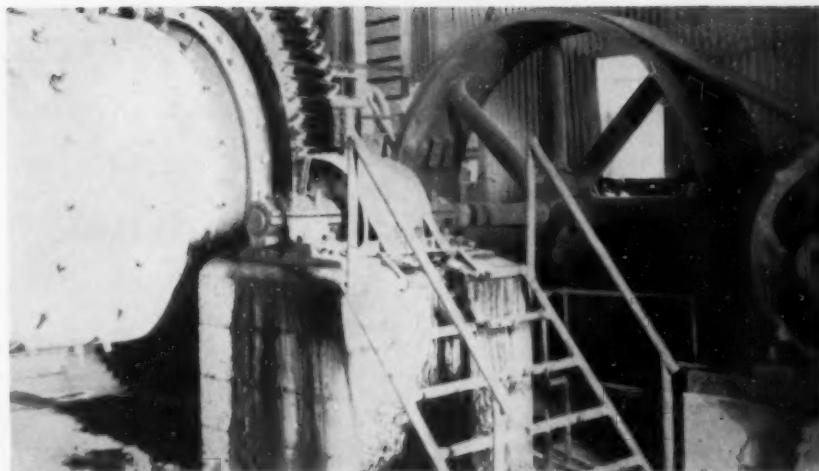
The water needles cost new, \$1.05 each, and this operator breaks about 60 per month. A welder can readily weld 100 in six to eight hours, and will use one pound of bronze costing 45 cents per pound, making the repaired needles cost about eight cents each for oxygen, acetylene, labor, etc.

The jig also has a lathe chuck plate on the outboard end which, by means of suitable jaws, can hold any small object that has to have a coat of metal built up on it.

"V" Belts on Flat Faced Pulleys

AT A WESTERN OPERATION all of the flat belt drives have been eliminated and replaced by "V" belts. The various plant units are all driven by individual motors. Grooved pulleys are used on the motors, but the unusual feature is the use of drive pulleys that are flat faced. (Pulleys with the crown removed.) Using flat faced pulleys instead of grooved pulleys on the driven side requires a strand or so of extra belting (depending on the horsepower required), but is considerably cheaper in first cost. The largest drive used is 150-hp. There is one 125-hp. drive, and several in the 5 to 20-hp. range.

About a year ago the 8-ft. diameter pulley on the 7-ft. x 8-ft. ball mill flew apart from internal defects. To replace it an 8-ft. diameter crowned pulley was "borrowed" from an extra compressor. This pulley was sent to a large machine shop nearby, and the crown removed in a lathe. The motor is a 150-hp. unit, and has a 14 groove pulley, 20-in. face and is 19½-in. in



Interesting application of V-belt drive from motor pulley to 8-ft. flat faced pulley on 7-ft. by 8-ft. ball mill

diameter. It drives the 8-ft. diameter pulley (28-in. face) on 8-ft. centers, and uses 14 strands of No. 430-D Gates Vulco rope drive. The drive has been very satisfactory.

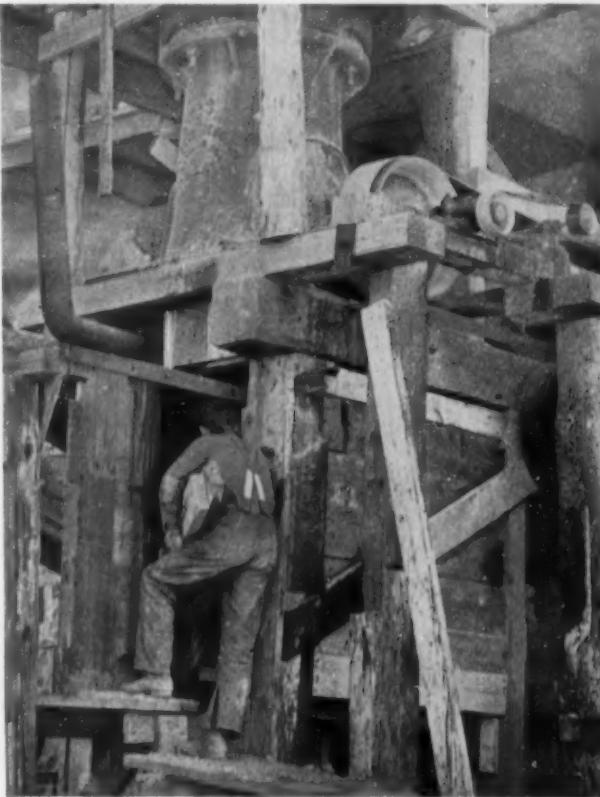
Heating Oil Pan of Crusher

DURING THE COLDER MONTHS of the year, the oil in our gyratory crusher does not begin to circulate as soon after starting in the morning as it should. The company had lighted a

small wood fire under the oil pan every morning to warm up the oil but found this a rather expensive practice, for a man must be employed to get the fire going early enough to have the machine ready for starting time, otherwise production is tied up until the oil is heated.

A small shed was therefore built under the crusher, the oil pan of the crusher forming the roof or ceiling. A small stove was placed in the shed and a small coal fire kept going all the time during the cold weather.

Small stove placed in shed under crusher keeps crusher warm and ready to operate in cold weather



LIME PRODUCERS' FORUM

Conducted by Victor J. Azbe, Contributing Editor, St. Louis, Mo.

Ideals In Vertical and Rotary Kilns

COMMENT ON THE STATUS OF ROTARY KILNS, which follows, is based on observations of some 20 units only, but all are greatly diversified in design and purpose. Although different in principle, they are governed by the same fundamentals as the vertical kilns, except in the method of heat absorption. In common with most vertical kilns, the rotary is also violating sound physics in some features of design.

There are any number of rotaries in operation where heat in the lime is not recovered at all, which is fatal in itself to good performance. In many cases the belief is held that the lime is cooled in the clumsy, uninsulated shell coolers; and they do cool, but the heat extracted is dissipated before it gets back into the kiln. Other kilns are so operated that there is much rotary wall exposed, but the lime moves only in a narrow strip down the bottom which, due to its limited top surface, can take on but little of the heat passing over it. There are kilns flaming at the rear end and kilns with 2000 deg. F. in the stack when temperature is judged correctly, although the pyrometer may amusingly show 800 deg. F. The material charged

is often in a diversity of sizes, handicapping the operation of the kiln. In virtually all rotary kilns stone is preheated with the heat that should be making lime, and heat that should have done the preheating is all wasted.

On a certain rotary kiln sintering dolomite, measured stack temperature was 1590 deg. F. and the gas analysis, CO₂-20 percent, Oxygen-5 percent; representing 24 percent of the total gases to air so that the corrected temperature to zero oxygen was 2050 deg. F.

Heat balance on one fairly efficient rotary kiln was:—

Stack Loss Due to Dry Products of Combustion and Excess Air and CO ₂	36 percent
Loss Due to Water Vapor from Hydrogen	6 percent
Loss Due to Radiation from Kiln	13 percent
Loss Due to Drawing of Hot Lime	15 percent
Heat of Conversion to Lime (Efficiency)	30 percent
	100 percent

If the lime had been drawn cool, not only would the heat have been saved, but more stone would have cooled the

gases to a lower temperature, capacity would have been greatly increased, and radiation would therefore have been reduced proportionately and efficiency could quite easily have gone up to around 50 percent.

A rotary may also be efficient, if the temperature at the two ends is lowered, and the heat saved is efficiently used. Much is now being done in that direction, and apparently the cooling of lime at least is being solved in a sound engineering manner, but the preheating of stone is not efficient. While there is ample excuse for long rotary kilns in the cement industry due to the nature and size of material used, that is not the case in the lime plant and one is safe to hazard the statement that although long kilns of 300 ft. and more may solve the problem of cooler gases, they are impressive only through mechanical bulk, rather than engineering ingenuity. Something is accomplished in the last 200 ft. of length that could as well be accomplished by intimate contact in two feet of height. It seems the direction of development in this respect at the Belle Isle Lime Plant is far more sensible.

Kiln Ideals

It is, of course, most important to keep one's feet on the ground and to be rather certain of any radical departure from the more ordinary before trying it in a costly manner. However, in our dreams at least we must go far beyond the more self-evident; we must create lofty ideals. There is only one requirement; they must be theoretically sound. They may have practical obstacles, but by creeping along these may be gradually overcome.

Fig. 1 shows an idealized form of rotary kiln. There is a finishing zone on the Warner principle; it is followed by a vertical lime cooler; the gas producer is blown with hot air and CO₂ as the endothermic agent; the calcining zone is rotary; the preheating zone is vertical; only part of the gases pass through the preheating zone; the balance of them pass through the regenerator, preheating air for combustion more than the lime cooler can do itself.

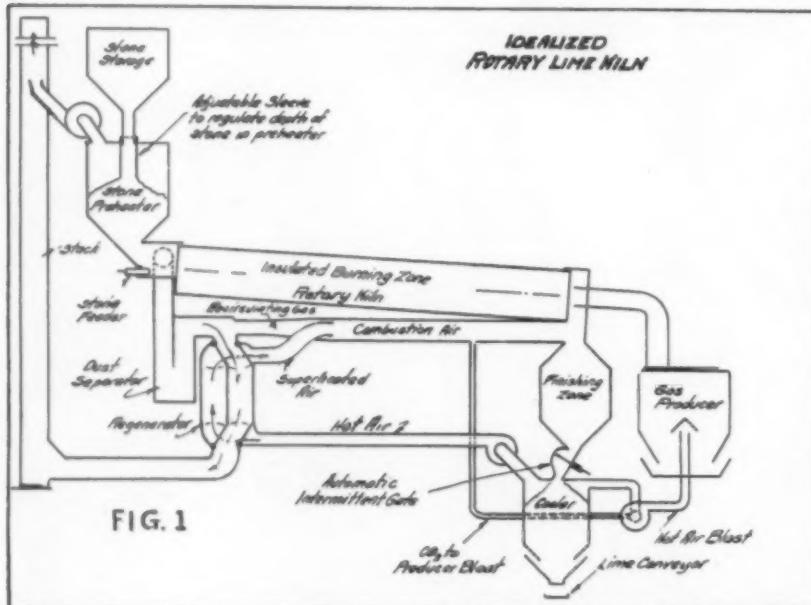
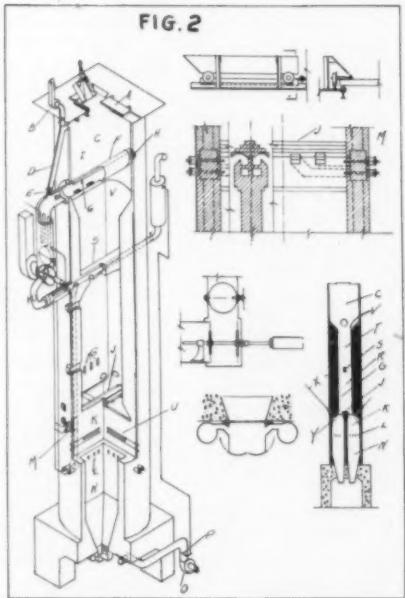


FIG. 1: Suggested design of an ideal rotary kiln with a finishing zone on the Warner principle, followed by a vertical lime cooler and a gas producer blown with hot air and CO₂ as the endothermic agent. The calcining zone is rotary and the preheating zone is vertical.

* Part of a paper delivered at the 19th annual convention of the National Lime Association, Chicago, Ill., May 12, 1937.

A few of the ideas incorporated are original with the writer. Others he obtained from other sources and combined as presented. Some have been tried, and tried successfully. The whole is composed of entirely workable units, and the total ensemble creates an ideal state wherein capacity would be the



Recently patented vertical kiln with numerous special zones, all having special duties

greatest, fuel consumption the least, and lime burned to the softest and most perfect kind. However, neither I nor anyone is prepared to furnish you with such a plant, but as a mental ideal it serves a great purpose.

Fig. 2 presents another departure from ordinary. It is an illustration from the writer's patent application. It, no doubt, will be recognized as a vertical lime kiln of many special features; some in very successful operation today, others awaiting the time when their application may serve some special purpose. It is a kiln not of three, but of numerous special zones all having special duties. No kiln would ever contain all of the features, but all of them will serve their purpose somewhere. There are provisions for finishing zones, for generation of high test CO_2 and dry ice plants, for supplementary electrical heating for burning of spalls, center and auxiliary firings; even for bleaching of lime in reducing atmosphere, foolish as that may sound.

STANDARD LIME & STONE CO., Baltimore, Md., celebrated at its Havre de Grace, Md., crushed stone plant on November 30, the fourth consecutive year without a loss time accident.

Freight Rate Hearings

EX PARTE 123, in which the railways are asking a blanket 15 percent increase on all freight and passenger rates, has been the cause of several hearings at different places in the United States before Interstate Commerce Commission members or examiners, during January. Producers and manufacturers of rock products have by no means been unanimous in arguing against the increase. The same is true of many other industries.

In a hearing at Chicago, Ill., January 10, M. S. Allison, appearing for the Federal American Cement Tile Co., and the concrete slab industry, said that while an increase in rail revenue was doubtless necessary, an increase in rates on such heavy loading, low value commodities as cement tile and slabs would be difficult, if not impossible to bear.

G. E. Gray, manager, Central Iowa Sand and Gravel Co., testifying for the Iowa Aggregates Producers' Association, brought on much cross-questioning from the commissioner by his testimony about special rail rates on road building materials. He said that, whereas but 17 percent of those materials in Iowa moved by truck in 1935, 40 percent of them moved by truck in 1937. The commissioner wanted to know whether or not it was the practice for the producers of the aggregates to reach agreements with carriers as to special rates before contracts were let and then to insist that immediate fourth-section relief be granted so as to avoid loss to producer and contractor.

"We are simply told we must grant the relief," Commissioner Aitchison said. "In effect, we are bought and sold behind our backs."

The witness said he had no knowledge of the details under which the railroads put in the special rates. All he knew was that, when they had been decided on, interested shippers were notified, usually by wire. He admitted that in about 10 percent of the cases where truck competition was alleged in order to obtain special rates, the shippers were "bluffing."

At an earlier hearing in Atlanta, Ga., January 7, A. C. Carson, of the Riverton Lime & Stone Co., said: "We have found by our own experience that increased costs of materials, labor, and taxation make it impossible for us to carry on without these increases being reflected in the cost of our product and our service, and judging from our own experience, we are of the opinion that the application of the railroads is a reasonable one and substantially in line with the advances in cost of operation

which we know that they have been subjected to."

Other rock products producers who appeared in behalf of the railways were W. M. Palmer, Dixie Lime Products Co. and E. B. Young, Raleigh Granite Co.

At a hearing in El Paso, Tex., January 6, E. R. Horton, Trinity Portland Cement Co., said: "We feel that an increase of 15 percent is excessive and not justified." Frank A. Leffingwell appeared at a New Orleans, La., hearing January 10, for the Texas Crushed Stone, Sand and Gravel Association and introduced exhibits to prove that an increase in rates would divert more of its members' business to motor trucks.

D. C. Stone, Denver, Colo., appearing at the Salt Lake City, Utah, hearing for the Western Feldspar Milling Co., said that this company is already located considerably farther from the principal markets (in Ohio, Pennsylvania and Indiana) than their chief rival, located in Spruce Pine, N. C., and that the 15 percent rate increase would impose too heavy a differentiation between the two producers and drive the Colorado concern from the field.

"Our margin is so close that we were only able to ship to the Pacific coast when the railroads granted a reduction of from \$9 to \$8.50 a ton. By raising the rates again we could not ship at all, and the carriers would deprive themselves of some very considerable tonnage. As it is, the freight charges are actually more than the value of the material, and an added 15 percent would put us right out of business," Mr. Stone said.

Re-discovered

ONE OF NEW ENGLAND's oldest magnesium limestone deposits has been rediscovered commercially and will be re-opened by Frederick Hazen at Bolton, Mass., in Worcester County, within 30 odd miles of Boston. Lime for much early colonial building was made at kilns on this property, but for many years the deposit's existence has been ignored by lime manufacturers, and it has been generally believed that the limestone deposit at Rockland, Maine, and those in the Berkshire Hills in western Connecticut, western Massachusetts and in Vermont were the only limestone deposits in New England. The Bolton quarry is said to contain a very pure magnesium limestone.

ASH GROVE LIME AND PORTLAND CEMENT CO., Louisville, Neb., is reported to be operating full time.

NATIONAL ASSOCIATION *Activities*

Sand and Gravel

NATIONAL SAND AND GRAVEL ASSOCIATION is seeking greater financial support for its research program. Alex. D. Dann, chairman of the research committee of the association, has addressed a letter to the industry in which he presents the problem of the association as follows:

"Recognizing the need for placing greater emphasis on the research activities of our association, the board of directors appointed the committee listed at the end of this letter for the purpose of studying research problems now before us and in prospect, examining present facilities for research and recommending the best procedure for the future. The committee reviewed these questions and made the following recommendations:

"1. There are many problems having to do with the production and use of sand and gravel for which answers are not now available. If answers were available, there should result reduced cost of production, more satisfactory materials, and the development of new fields for profitable sales. Among the questions which will occur to all of us are: (a) use of sand and gravel in bituminous mixtures; (b) cracking of concrete roads as affected by aggregates; (c) methods for measuring soundness and durability of aggregates; (d) effect of aggregate particles generally considered injurious; and many others which space does not permit of listing.

"2. In the interest of preserving present markets and developing new markets, it is imperative that our research work keep pace with that of other industries, and particularly those serving the same field as ourselves.

"3. The present laboratory equipment is good but in limited space and in a somewhat undesirable location without enough room for the addition of needed equipment. (As later noted this condition has already been corrected.)

"4. Facilities and personnel of the University of Maryland warrant a co-operative arrangement between the Association and the University. Ample space is available at the University for the installation of present equipment of the association and needed additional equipment.

"5. To conduct needed researches, additional laboratory equipment must

1938 Conventions

NATIONAL Concrete Masonry Association, National Cinder Concrete Products Association annual conventions, February 8-11, incl. Hotel Sherman, Chicago, Ill., in conjunction with the American Concrete Contractors' Association. The Cast Stone Institute, Medina Club, Chicago, February 7-8. The Concrete Industries Exposition at the Hotel Sherman, February 8-11.

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AMERICAN Concrete Pipe Association annual convention at the Plaza Hotel, San Antonio, Texas, February 15-16.

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AMERICAN Concrete Institute, annual convention at Palmer House, Chicago, February 22, 23, and 24.

"The research committee requests that each member of the industry give serious thought to this matter and take action promptly in order that officers of the association may know to what extent the industry will support research work during the years 1938 and 1939. Your frank and constructive comments and suggestions are invited in order that the research program of the industry may be carried out in the most effective manner.

"The committee has not determined upon any fixed measure for individual subscriptions, but it does suggest that, in order to raise the amount needed, such subscriptions should be somewhere in the range of one-fourth to one-half mill per ton of annual production or sales for 1937 (25 to 50c per thousand tons)."

The other members of the research committee, besides Alex. W. Dann, are: Otto S. Conrades, Alexander Foster, Jr., W. H. Klein, and Stephen Stepanian.

Industrial Sand

THE FREIGHT RATE situation in the industrial sand industry was reported on by V. P. Ahearn, executive secretary, National Industrial Sand Association, to his member companies, under date of January 8, in part as follows:

"The Interstate Commerce Commission granted the carriers application to publish on one day's notice increases of 20c in the present interstate rates on sand in boxcars. To date, the carriers have not published such tariffs, and no changes have been made in the rates, either state or interstate.

"The state commissions of Illinois, Indiana, Ohio, Pennsylvania and New York suspended the intrastate increases. In New Jersey, the carriers withdrew their tariffs (upon suspension of the interstate tariffs) before the New Jersey Commission had acted upon the industry's protest. In anticipation of 20c increased rates being filed, the protest to the New Jersey Commission is to be considered as protest against such tariffs if and when filed, and the New Jersey Commission has retained the protests for such application. In New York State application for authority to publish on short notice was denied. In Pennsylvania, hearing of the carriers' case upon sand in boxcars (and numerous other commodities) was held at Harrisburg on January 4 and 5 and adjournment was taken to a date not

yet fixed for introduction of protestants' testimony. No other state proceedings are assigned for hearing before the last week of the month."

Lime

NATIONAL LIME ASSOCIATION announces that arrangements have been made for an exhibit featuring the use of lime in construction in the Building Industries Exposition, sponsored by Marshall Field, located on the seventh floor of The Merchandise Mart in Chicago, Ill. The exhibit will be on display for one year.

Concrete Burial Vault

Plans are now being laid for the annual convention of the National Concrete Burial Vault Association. The meetings will be held at the Hotel Statler, Detroit, Mich., on May 10 and 11.

Agricultural Limestone

MIDWEST AGRICULTURAL LIMESTONE INSTITUTE held a special meeting in Chicago, Ill., January 4, to discuss freight rates, Farm Bureau relations and sales policies. The recent 5 and 10c freight rate advances have been suspended in Illinois by the state public service commission for 90 days. An effort will be made to have the 15 percent advances suspended, should the Interstate Commerce Commission decide for the railways. The farm bureau organization is aiding in this work.

John R. Spencer, director, soil conservation department, Illinois Agricultural Association was present as a luncheon guest. Close harmony in the distribution of agricultural limestone is being worked out between the two associations.

morning of February 10, to afford an opportunity to attend the concrete contractors session and to inspect the exhibits.

Co-operative Selling

In the afternoon, delegates will learn how to get business in the backup market from one who has been successfully selling this market. Other papers will describe the co-operative selling program that has been getting the business for the Detroit Concrete Products Association, and the activities of concrete house builders in Lansing, Mich. The precast joist concrete floor, and its value in promoting the sale of concrete masonry for above grade construction is the subject of one paper. This meeting will end with the election of officers and directors, and is to be followed by the joint banquet for all in attendance.

The morning of February 11 will be open for round table discussions of subjects continued from other sessions and for questions. Manufacturers will have an opportunity to tell about their sales promotion experiences and to freely discuss manufacturing problems and new construction methods. Codes, specifications and business prospects will come up for consideration. The convention will close with an afternoon meeting of new directors, and inspection trips through the Underwriters' laboratories and the Portland Cement Association laboratory.

Cast Stone Institute

Meetings of the Cast Stone Institute are to be held at the Medinah Club, Chicago, on February 7 and 8. Committees will be appointed and the secretaries' report will be read the first morning, followed by a paper on the "Application of the Electric Hammer to the Manufacture of Cast Stone."

After luncheon, a paper will be read describing the application of color to architecture through the medium of cast stone. Following the discussion, a report on laboratory tests of pointing compounds will be read. In the evening, demonstrations at the laboratory of the Portland Cement Association will be followed by informal discussions and a special demonstration on mixing at the Medinah Club.

On Tuesday, there will be a paper which will outline the effect on the future of the cast stone industry through the increasing use of concrete, architecturally. The secretary will report on field work conducted among architects, and the morning session will end with a discussion of common operating problems.

In the afternoon, cast stone manufacturers will meet jointly with the National Concrete Masonry Association.

Concrete Masonry Convention Program Highly Diversified

CONVENTION ARRANGEMENTS have been completed for the most instructive and diversified program yet offered to manufacturers of concrete masonry. The meetings will be held at the Sherman Hotel, Chicago, February 8, 9, 10 and 11, in co-operation with other groups interested in concrete and the Concrete Industries Exposition.

Many of the problems and developments in concrete are inter-related so closely that it has been possible to arrange a convention program incorporating subjects that could be profitably used by all in attendance at the conventions. The latest developments in machinery and methods will be on display, and sufficient time is provided that all may see them.

On February 8, the morning session of the National Concrete Masonry Association has been left open for meetings of state and local groups of concrete products manufacturers, and to allow time for attendance at the American Concrete Contractors Association meeting and the Concrete Industries Exposition.

Concrete Houses

The afternoon meeting will be concerned mainly with housing. One of the papers will be on the housing market, and the adaptation of concrete masonry units to that market. Another paper by a concrete house builder will discuss profit opportunities offered by the firesafe concrete home to the operative builder. This meeting will conclude with papers discussing the use of prefabricated sections in wall con-

struction and a treatment of the "White Steel Monolithic Method" of precast slab construction.

Manufacturing Methods

The Wednesday morning session on masonry will be devoted principally to new developments in manufacturing methods and recommended practices. Manufacturers of concrete products will be given the opportunity to get first hand information from plant operators on the results of their experiences with electrical curing and high pressure steam curing. Representatives of other outstanding concerns will present recommendations on the unit sizes which should be kept in stock in order to properly service a job in concrete masonry, and will discuss the need for standardizing textures of concrete masonry units. Other speakers will discuss fire insurance rates and their application to concrete masonry, and proper methods of storing units during the curing process.

Manufacturers of concrete masonry will meet jointly that afternoon with the concrete contractors to hear about recent legislation concerned with housing and other construction. Costs of building and building values also will be discussed. The concluding speaker will review progress made by the concrete industries, and will forecast prospects for the future. The National Cinder Concrete Products Association will hold a meeting the evening of February 9.

No meetings of concrete masonry manufacturers will be held on the

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	Dividends		Stock	Date	Bid	Asked	Dividends	
Aetna P. C., cap. ^{\$1}	1-21-38	21	..	.25	Dec. 21	National Gypsum, A., com.	1-19-38	6 ¹ / ₂	7	Q 1.75	Dec. 22
Allentown P. C. (Penn.), com. ^{\$1}	1-21-38	6	..			National Gypsum, 1st pfds.				Q .25	Dec. 22
Allentown P. C. (Penn.), 6% cum.						National Gypsum, 2nd pfds.					
Alpha P. C., com.	1-21-38	9	..			National L. & S., 6 ¹ / ₂ 's, 1941 ⁴⁰	1-13-38	90	..		
American Aggregates, 1st mtg.	1-19-38	12 ¹ / ₂	13			Nazareth Cement, com. ^{\$1}	1-17-38	5	7		
3/6% 1945 new bond ^{\$1}	1-13-38	80 ¹ / ₂	81 ¹ / ₂			Nazareth Cement, 7% pfds.	1-17-38	90	..		
American Aggregates, 6% 1948 ⁴⁰ Called all 2/6's now	1-13-38	2	3			Newaygo P. C. pfds.	1-13-38	30	..		
American Aggregates, com. ^{\$1}	1-13-38	25	35			New England Lime, units ^{\$1}	1-13-38	10	13		
Arundel Corp., com.					Q .25						
Ash Grove L. & P. C., com. ^{\$1}	1-21-38	11	..			N. Y. Trap Rock, 7% pfds.	1-13-38	60	..	1.75	Jan. 1
Ash Grove L. & P. C., pfds. ^{\$1}	1-21-38	92	..			North Amer. Cement, 3/4's, 1940 ⁴⁰	1-17-38	60	..		
						North Amer. Cement, 6 ¹ / ₂ 's, 1943 ⁴⁰	1-17-38	75	..		
Basic Dolomite Inc., com.						North Amer. Cement, 1st 6 ¹ / ₂ 's					
Bessemer L. & C., com. ^{\$1}	1-13-38	3 ¹ / ₂	4 ¹ / ₂			1953 ⁴⁰	1-17-38	25	..		
Bessemer L. & C., pfds. ^{\$1}	1-13-38	20	..			North Amer. Cement "A" pfds.	1-17-38	3	..		
Bessemer L. & C., 1st 6 ¹ / ₂ 's, 1947 ⁴⁰	1-13-38	90	..			North Amer. Cement, com. ^{\$1}	1-17-38	1 ¹ / ₂	1 ¹ / ₂		
Bessemer L. & C., 6's, 1955 ⁴⁰	1-13-38	90	..			North Amer. Cement "B" pfds.	1-17-38	5	..		
Boston S. & G., com. ^{\$1}	1-13-38	1	2			North Shore Mat., 1st 6 ¹ / ₂ 's					
Boston S. & G., 7% pfds.	1-13-38	6	10			See Consumers Co. 5%					
Boston S. & G., 7's 1939 ⁴⁰	1-13-38	80	..								
Calveras Cement, com. ^{\$1}	1-18-38	1 ¹ / ₂	5 ¹ / ₂								
Calveras Cement, 7% pfds.	1-18-38	50	..								
California Art Tile, BPs.	1-13-38	7 ¹ / ₂	8 ¹ / ₂								
Canada Cement, com. ^{\$1}	1-19-38	12	..								
Canada Cement, com. ^{\$1}	1-19-38	107	..								
Canada Cement, 4 ¹ / ₂ 's, 1951 ⁴²	12-21-37	102	103								
Canada Crushed Stone, 6 ¹ / ₂ 's, 1944 ⁴⁵ Called December 16											
Carolina P. C., 8% cum. pfds.	1-21-38	50	..								
Consol. Cement, Amt.											
Consol. Cement, 1st 6's, 1950 ⁴⁰	1-17-38	57	..								
Consol. Okla. & G. 6's, 1948	1-21-38	21	24								
Consol. Rock Products, units ^{\$1}	1-17-38	1 ¹ / ₂	1								
Consumers R. & G. 1st Mtg. 6's 1948 ⁴¹											
Consumer Co., 5's	1-17-38	49	50 ¹ / ₂								
Coosa P. C., 1st 6's											
Coplay Cement Mfg., units ^{\$1}	1-17-38	12	17								
Coplay Cement Mfg., 6's, 1941 ⁴⁰	1-17-38	90	..								
Cumberland P. C., units ^{\$1}	1-21-38	40	..								
Cumberland P. C., 7's, 1937 ⁴¹											
Deweys P. C., com. ^{\$1}	1-21-38	25	27								
Diamond P. C. ^{\$1}	1-13-38	8 ¹ / ₂	9 ¹ / ₂	.25	Dec. 20						
Dolase & Shepard											
Federal P. C., 5's 1947 ⁴⁸											
Federal P. C., 5% 1941 ⁴²	1-13-38	68	..								
Flo. P. C., units ^{\$1}	1-17-38	23	25								
Flo. P. C., 6 ¹ / ₂ 's, 1951 ⁴²	1-13-38	99 ¹ / ₂	..								
Giant P. C., com. ^{\$1}	1-17-38	1 ¹ / ₂	3								
Giant P. C., pfds.	1-17-38	11	13								
Glen Falls P. C., com. ^{\$1}	1-21-38	10	12								
Glen Falls P. C., pfds.	1-21-38	78	..								
Great Lakes P. C., BPs.	1-21-38	1 ¹ / ₂	..								
Gyp., Lime & Alabastine	1-19-38	7 ¹ / ₂	..								
Gyp., Lime & Alabastine, 5 ¹ / ₂ 's, 1948 ⁴²	12-21-37	99 ¹ / ₂	100								
Hawkeye P. C., cap. ^{\$1}	1-17-38	36	..								
Hercules Cement, com. ^{\$1}	1-21-38	50	60								
Ideal Cement, com. ^{\$1}	1-17-38	23	24 ¹ / ₂	E .50	Dec. 22						
U. S. Gypsum, com.											
U. S. Gypsum, pfds.											
Keller Island L. & T.											
Ky. Rock Asphalt, 6 ¹ / ₂ 's, 1936 ⁴⁶	1-13-38	40	43								
Ky. Stone Co., v.t.c. ^{\$1}	1-13-38	5	..								
Ky. Stone Co., 5% 1956 ⁴⁶	1-13-38	43	..								
Keystone P. C., pfds.	1-21-38	18	..								
Lawrence P. C., com.	1-19-38	13 ¹ / ₂	15 ¹ / ₂	1.00	Dec. 15						
Lawrence P. C., 5 ¹ / ₂ 's, 1942 ⁴³	1-17-38	99	11 ¹ / ₂	.25	Feb. 1						
Lehigh P. C., com.	1-19-38	16 ¹ / ₂	17 ¹ / ₂	1.00	Jan. 1						
Lehigh P. C., 4% pfds.											
Lone Star Cement, com.	1-19-38	34 ¹ / ₂	35 (yr. end.)	.75	Dec. 13						
Louisville Cement	1-20-38	35	40								
Lyman-Richey, 1st 7's, 1939-40											
Longhorn P. C. Co. ^{\$1}	1-21-38	5 ¹ / ₂	6 ¹ / ₂								
Marblelite Corp., com. ^{\$1}	1-14-38	.25	.40								
Marblelite Corp., pfds.	1-18-38	..									
Marblehead Lime, 7's, 1944 ⁴⁵	1-13-38	85	99								
Marquette Cement, com.	1-18-38	5	6								
Marquette Cement, pfds.	1-17-38	102	..								
Material Service Corp. ^{\$1}	1-17-38	1 ¹ / ₂	..								
McCrady-Rodgers, Class "A" ^{\$1}	1-17-38	5	6								
McCrady-Rodgers, 7% pfds.	1-17-38	21	..								
Medusa P. C., com.	1-19-38	18 ¹ / ₂	..								
Medusa P. C., 6% cum. pfds.	1-21-38	96	..								
Minnesota Mining & Mfg. Co.											
Missouri P. C.	1-19-38	12 ¹ / ₂	..								
Monarch Cement, cap. ^{\$1}	1-21-38	90	..								
Monolith P. C., com. ^{\$1}	1-14-38	3 ¹ / ₂	4								
Monolith P. C., 8% pfds.	1-14-38	6	7	.50	Dec. 15						
Monolith P. C., 1st mtg.	Called January 1										
Monolith Portland Midwest, pfds.	1-14-38	2 ¹ / ₂	3 ¹ / ₂								
Waukesha P. C., com.											
Waukesha P. C., 8% pfds.	1-17-38	8 ¹ / ₂	..								
Warner Co., mw. 1st 6's, 1944 ⁴⁶	1-13-38	63	..								
Warner Co., pfds.	1-17-38	3	5								
Warner Co., pfds.	1-17-38	7 ¹ / ₂	10 ¹ / ₂								
Whitehall Cement Mfg., com.	1-21-38	50	..								
Whitehall Cement Mfg., pfds.	1-21-38	52	..								
Wisconsin L. & G., 1st 7's, 1940 ⁴¹	1-13-38	70	75								
Wolverine P. C., com.											
Yosemite P. C., 4% pfds.	1-18-38	3	3 ¹ / ₂	.10	Dec. 27						
Quotations by P. A. E. White Co., San Francisco, Calif. ¹ The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. ² W. Hobbs & Seaver, Inc., Boston. ³ Martin Judge Jr., and Co., San Francisco, Calif. ⁴ Nesbitt, Thomson & Co., Ltd., Toronto, Ont. ⁵ First National Bank of Chicago, Chicago, Ill. ⁶ E. H. Ladin & Co., New York, N. Y. ⁷ Rogers & Tracy, Inc., Chicago, Ill. ⁸ Paul D. Sheehan & Co., Boston, Mass. ⁹ Merrill, Turber & Co., Cleveland, Ohio.											

RECENT DIVIDENDS ANNOUNCED

Alpha P. C. Cap.....	\$0.25	Dec. 21
Arundel Corp., com. (Q)...	.25	Jan. 3
Bessemer L. & C. Co.....	3.00	Dec. 27
Basic Dolomite Inc. c. (E)...	1.00	Dec. 15
Basic Dolomite Inc. c. ....	.05	Dec. 15
Canada Cement Co. 6 1/2% pfd.	3.25	Mar. 21
Diamond P. C. ....	.25	Dec. 20
Florida P. C. 7% pfd.	1.75	Dec. 20
Giant P. C. pfd.	1.00	Dec. 22
Ideal Cement Co. com. (E)....	.50	Dec. 22
Ideal Cement Co., com. ....	.50	Dec. 22
Kelley Island L. & T. ....	.40	Dec. 15
Lawrence P. C., com.	1.00	Dec. 15
Lehigh P. C., com. ....	.25	Feb. 1
Lehigh P. C. 4% pfd.	1.00	Jan. 1
Lone Star Cement com. (yr. end) ....	.75	Dec. 23
Lone Star Cement com. ....	.75	Dec. 23
Material Service Corp.	1.00	Dec. 23
Medusa P. C. com. ....	.50	Dec. 24
Medusa P. C. pfd. (Q)....	1.50	Jan. 1
Minnesota Mining & Mfg. Co. ....	.75	Dec. 22
Monarch Cement Cap.	4%	Dec. 27
Monolith P. C. 8% pfd. ....	.50	Dec. 15
National Gypsum Co. 1st pfd. (Q)	1.75	Dec. 22
National Gypsum Co., 2nd pfd. (Q) ....	.25	Dec. 22
N. Y. Trap Rock 7% pfd.	1.75	Jan. 1
Pacific Coast Aggr., new, com. ....	.05	Dec. 17
Penn. Glass Sand Corp., vtc. ....	.50	Dec. 15
Penn. Glass Sand Corp. pfd. (Q)	1.75	Jan. 1
Riverside Cement Co. pfd. ....	.50	Feb. 1
Riverside Cement Co. A. ....	.15	Dec. 24
Santa Cruz P. C. pfd. ....	.50	Jan. 15
Signal Mt. P. C. pfd.	3.00	Dec. 22
Spokane P. C. units.	2.00	Dec. 22
Superior P. C. A. ....	.27 1/2	Dec. 24
Superior P. C. B. ....	.50	Nov. 29
U. S. Gypsum Co. pfd. (Q)....	1.75	Jan. 3
U. S. Gypsum Co., com. (Q)....	.50	Dec. 31
U. S. Gypsum Co., com. (E)....	.50	Dec. 24
Yosemite P. C., 4% pfd. ....	.10	Dec. 27

CANADA CEMENT CO., LTD., Montreal, Que., J. D. Johnson, president, reports for the fiscal years ended November 30:

	1937	1936
*Operating profit	\$3,967,257	\$2,940,180
Depreciation	1,250,000	1,027,829
Salaries and fees	129,542	77,759
Bond conversion expense	112,155	54,666
Balance	2,475,580	1,779,926
Bond interest	639,382	929,435
Mortgage interest	39,125	41,250
Income taxes	336,000	146,000
Net income	1,461,054	663,241
Preference dividends	903,911	.....
Surplus for year	557,143	663,241
Previous surplus	1,715,027	1,035,647
Prior year adjustment (cr)	16,777	16,139
Surplus, November 30.	2,288,948	1,715,027
Times interest earned	3.65	1.83
Earned per share, preferred	\$7.27	\$3.30
*Including investment income: 1937, \$42,521; 1936, \$109,273.		

Current assets, as of November 30, 1937, were \$5,160,268, of which \$1,835,691 was cash and \$1,599,961 inventories. Current liabilities were \$978,543.

President Johnson said: "There was a general improvement in the building industry in the year 1937; in fact, a more healthy increase took place in the past year than in any year since the depression low of 1933. The issue of building permits in 1937 was 36 percent greater than in 1936. While this is encouraging in itself, it may be stated that the industry has not reached a point that could be called normal. Based upon the permits issued, total volume of construction in 1937 was only 59 percent

of that in 1926, and only 39 percent of that in 1929, which, however, was a peak year in Canada.

"The results of the year's operations show a considerable improvement over the previous year. Net earnings, after providing an amount of \$1,250,000 for depreciation, and making provision for Provincial and Dominion income taxes, increased from \$663,241.55 to \$1,461,054.38. The net working capital shows an increase of \$952,769.04, from \$3,228,956.20 to \$4,181,725.24. Bonds retired during the year amounted to \$750,000, and the mortgage on the Canada Cement Building was reduced by \$75,000.

"The expenditures made during the past several years to modernize the machinery in your plants, and the improvements made in distribution facilities, have resulted in more efficient and economical operation of the whole system. Capital expenditures during the year were very small, amounting only to \$222,384.88. On the whole, your plants are modern and up to date.

"Dividends declared during the fiscal year on the preference stock were for the first two quarters at the rate of \$1.00 per share, and for the last two quarters at the rate of \$1.25 per share; on December 17 a dividend of \$2.00 per share, to bring the total for the fiscal year to \$6.50 per share.

"You are no doubt interested particularly in the prospects for your Company for the coming year. Your management is looking forward with considerable confidence to 1938, not that it is expected at the moment that 1938 will show an increase over 1937, but indications are that a fair volume of business will be maintained."

LONGHORN PORTLAND CEMENT CO., San Antonio, Tex. (formerly the Republic Portland Cement Co.) reports for the nine months and three months, ended September 30, 1937:

	3 mos.	9 mos.
Net profit	\$55,063	\$274,610
Earned per share, common	\$0.15	\$0.90
Number of common shares, 249,580.		

VULCANITE PORTLAND CEMENT CO., Philadelphia, Penn., made an agreement with holders of its 7 1/2 percent, first mortgage sinking fund bonds due 1943, ratified August 3, 1937, under which defaults of sinking fund payments were settled by the immediate payment of \$70,000 to the sinking fund, plus a monthly deposit of \$2000, retroactive to January 1, 1937. As of December 31, 1937, the amount of bonds outstanding was \$149,600.

LONE STAR CEMENT CORP., New York City, is reported to have entered contracts with 14 officers of the corporation and 5 officers of wholly-owned subsidiaries, whereby they may pur-

chase a total of 13,400 shares of the corporation's common stock, until December 31, 1940, at \$34 per share. C. L. Hogan, president, heads the list with an option to buy 4400 shares, the remaining options running from 500 to 1000 shares each.

DEWEY PORTLAND CEMENT CO., Kansas City, Mo., filed a registration statement with the SEC, covering the proposed issue of 396,420 shares of \$15 par value common stock. According to the registration statement the present offering will consist of 115,000 shares for the account of certain stockholders. None of the proceeds would accrue to the company.

INCOME ACCOUNT (as reported to the SEC):

	9 mos. to Sept. 30, '37	Yrs. to Dec. 31— 1936	1935
Net sales	\$2,808,502	\$3,717,603	\$2,508,725
Cost of sales	1,468,399	1,873,972	1,170,701
Expenses	366,535	408,375	394,467
Depletion and depreciation	230,604	302,851	307,688
Other profit	742,964	1,132,405	635,869
Margin of profit	26.45%	30.46%	25.35%
Other income	65,520	119,633	118,796
Total income	808,484	1,252,038	754,665
Income deducted	18,818	777	4,174
Income taxes	\$136,000	216,663	104,437
Net income	683,666	1,034,598	646,054
Preferred dividends	8,992	17,983	17,983
Common dividends	397,312	1,030,000	600,000
Surplus for period	247,362	(d) 13,385	28,071
Previous surplus	2,431,921	2,445,306	2,417,235
Credits	10	.....	.....
Adjustments	948,455	.....	.....
Surplus end of period	1,730,838	2,431,921	2,445,306
Earned per share	\$1.65	\$2.61	\$1.63
*Based on 396,420 common shares, disregarding preferred dividends paid.			
†Par value of stock issued in excess of par value of stock retired through reorganization.			
‡No provision made for Federal surtax.			
BALANCE SHEET, as of September 30, 1937 (as reported to the SEC):			
Assets:			
Fixed assets (after \$2,811,484 res.)	\$2,997,692		
Construction in progress	57,820		
Investment in and due from subsidiaries	5,740		
Stockholders' notes receivable and interest	252,553		
Other investments	2,400		
Current Assets:			
Cash	678,355		
*Marketable securities	2,566,570		
Notes and accounts receivable (net)	458,392		
†Inventories	505,943		
Repair parts, supplies, bags, etc.	345,766		
Other assets	175,067		
Prepayments, etc.	3,662		
Total	\$8,049,961		
Liabilities:			
Capital stock (par \$15)	\$5,946,300		
Current Liabilities:			
Accounts payable	78,133		
Accruals	108,607		
Federal and State income taxes	186,082		
Earned surplus	1,730,839		
Total	\$8,049,961		
Current assets	\$4,209,260		
Current liabilities	372,822		
Working capital	3,836,438		
*Market value at November 26, 1937. \$2,591,012.			
†At cost, not in excess of market.			

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of January 10:

Trunk

36406. Limestone, crushed or broken, ground or pulverized, C. L., min. wt. 60,000 lb., from Stafford, N. Y., to Trunk Line territory, in lieu of present sixth class rates. Reason—Rates are made Docket 25220 scale.

36409. Gravel, sand, slag, stone, crushed, coated with oil, tar, asphaltum, in open top cars, C. L. (see Note 3), the oil, tar and/or asphaltum not to exceed 10 percent by weight of the commodity as shipped, the shipper to so certify on shipping order and bills of lading; from Dunbar, Penn., to B. & O. R. R. stations, Point Pleasant, W. Va., to Glenwood, W. Va.—proposed \$1.74, Clover, W. Va., to W. Huntington, W. Va.—proposed \$1.80, Millender, W. Va.—proposed \$1.86, and Kenova, W. Va.—proposed \$1.86, in lieu of present rates ranging from \$2.34 to \$2.68 per net ton. Reason: Account comparable rates to competitive destinations.

36410. Dolomite, crude, C. L. (see Note 3), from Billmeyer, Penn., to Riddlesburg, Penn., \$1.47 per gross ton, in lieu of present 6th class rate. Reason: Compares favorably with rate from Billmeyer, Penn., to other destinations.

Sup. 1 to 36410. Dolomite, crude, C. L. (see Note 3), from Millville, W. Va., to Riddlesburg, Penn., \$1.47 per gross ton, in lieu of present sixth class rate. Reason: Compares favorably with rate from Millville, W. Va., to other destinations.

36425. Sand, moulding, C. L. (see Note 3), from points in the Albany district on N. Y. C. R. R., to Canadian National Rys. stations in N. S., N. B., Que. and Ont. Reason: Proposed rates are same as now published in D. & H. R. I. C. C. 58 on their line in the Albany district.

36436. Sand (other than ground or pulverized or naturally bonded moulding), in open top cars, without tarpaulin or other protective covering, C. L., crushed stone and screenings, C. L. (will not include agricultural limestone, ground limestone or firestone, unburnt; or stone coated with oil, tar or asphaltum), (see Note 3), from Naginey, Penn., to cement mills in the Lehigh district, \$1.60 per net ton in lieu of present sixth class rate. Reason—Rate reflects joint Lycoming scale to practically all points.

36442. To establish switching rate of \$8.10 per car on sand from plant of Founders' Supplies, Inc., South Michigan Ave. Yard, Buffalo, N. Y., to plant of the Great Lakes Portland Cement Co., Buffalo, N. Y., in lieu of present rate of 50c per ton per P. R. R. I. C. C. 1646. Reason: Comparable with present switching rates in the Buffalo District per P. R. R. I. C. C. 1646.

36477. To establish rates on sand (except naturally bonded molding and ground or pulverized sand) in open top cars without tarpaulin or other protective covering. Sand, naturally bonded molding in all kinds of equipment, and sand (except ground or pulverized sand) in closed equipment. Sand, ground or pulverized (See Note 3), from Ford City, Penn., to various points in Trunk Line and Central Freight territories, in lieu of present sixth class rates. Reason—Based on I. C. C. Docket 22907 scales, plus increases.

36456. Sand (other than ground or pulverized), sand, naturally bonded molding (see Note 3), and clay, crude (common or fire), C. L., min. wt. 60,000 lb., except when a car of less capacity is furnished in which case marked capacity of car will govern, from Jennings, Md., to points in Trunk Line territory. Reason: Rates on sand re-

flects I. C. C. industrial sand scale plus 30c rates on crude clay made 80 percent of I. C. C. Docket 10733 scale increased 20c.

36457. Limestone, crude, fluxing, foundry and furnace, C. L. (see Note 3), from Howard, Penn., to Trunk Line destinations. Reason: Same rates as now in effect from Bellefonte district.

Central

52937 (W. T. L. File EB-22907-Pt. 4, Pro. 10765). To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized in all kinds of equipment, C. L.; (c) sand (except naturally bonded moulding, ground or pulverized sand), in open top equipment, C. L.; from Ottawa, Ill., district to Millington, N. J.: (a) 420c; (b) 462c, and (c) 420c per net ton. Routing—Via C. B. & Q. or C. R. I. & P., Chicago, Ill., thence Wabash or N. Y. C., Black Rock, N. Y., D. L. & W.; via C. B. & Q. or C. R. I. & P., Chicago, Ill., thence N. Y. C. & St. L. or P. R. R., Buffalo, N. Y., D. L. & W.; via C. B. & Q. or C. R. I. & P., Chicago, Ill., C. & E. (Erie System), Marion, O., Erie R. R., Binghamton, N. Y., D. L. & W.

52938 (W. T. L. I. C. C. Dkt. EB-22907, Pt. 4, Pro. 10791). To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding, ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L.; (c) sand (except naturally bonded moulding, ground or pulverized sand), in open top equipment, C. L.; from Ottawa, Ill., district to Woodville, Ohio: (a) 220c; (b) 242c, and (c) 215c per net ton. Routing—Via C. B. & Q. R. R. or C. R. I. & P. Ry., Chicago, Ill., P. R. R.

52939 (W. T. L. File EB-22907, Pt. 4, Pro. 10768). To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding, ground or pulverized sand), in closed equipment, C. L.; (c) sand, ground or pulverized, in all kinds of equipment, C. L.; (c) sand except naturally bonded moulding, ground or pulverized sand), in open top equipment, C. L.; from Ottawa, Ill., district to Uhrichsville, O.: (a) 280c; (b) 308c, and (c) 280c per net ton. Routing—Via C. B. & Q. R. R. or C. R. I. & P. Ry., Chicago, Ill., B. & O. R. R. or P. R. R.

52940 (W. T. L. File EB-22907, Pt. 4, Pro. 10767). To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding, ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L.; (c) sand (except naturally bonded moulding, ground or pulverized sand), in open top equipment, C. L.; from Ottawa, Ill., district to Evansville, Ind., group to Larimore, Mo., rates of (A) 180c, (B) 198c, and (C) 145c per net ton, via C. B. & St. L. Ry., East St. Louis, Mo., C. B. & Q. R. R.**

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

**When a shipper orders a car of above mentioned marked capacities or greater, and the carrier is unable to furnish car ordered and furnishes a car of greater capacity than that ordered, the min. wt. for the car furnished will be that which would have obtained had the car ordered been furnished and used.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

to Schuyler, Va. (a) 410c; (b) 451c, and (c) 410c per net ton. Routing—Via C. B. & Q. or C. R. I. & P. Chicago, Ill., C. & O., Esmont, Va., thence the Nelson & Albemarle R. R.

52941 (W. T. L. File EB-22907, Pt. 4, Pro. 10766). To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding, ground or pulverized sand) in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L.; (c) sand (except naturally bonded moulding, ground or pulverized sand), in open top equipment, C. L.; from Ottawa, Ill., district to Marysville, Mich.: (a) 270c; (b) 297c, and (c) 270c per net ton. Routing—Via C. B. & Q. R. R. or C. R. I. & P. Ry., Chicago, Ill., G. T. Ry. or P. M. Ry., Port Huron, Mich., thence P. H. & D. D.

52942 (W. T. L. I. C. C. Dkt. EB-22907—Pt. 4-Pro. 10818). To establish on ground and pulverized silica sand (Col. B), as described in Agt. Kipp's Tariff No. 41-W. C. L., from Ottawa-Utica, Ill., district to Bluestone and Farmer, Ky., 352c per net ton.

52982 (WTL I. C. C. Dkt. EB-22907-Pt. 4-Pro. 10892). To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand) in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L.; and (c) sand (except naturally bonded moulding; ground or pulverized sand) in open top equipment, C. L. (see Note 3), but orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from Ottawa, Ill., district to Marine City, Mich.: (a) 280c; (b) 308c and (c) 280c per net ton. Route: Via C. B. & Q. R. R. or C. R. I. & P. Ry., Chicago, Ill., G. T. Ry. or P. M. Ry., Port Huron, Mich., thence P. H. & D. R. R.

52986 (WTL I. C. C. Dkt. EB-22907-Pt. 4-Pro. 10891). To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand) in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L., and (c) sand (except naturally bonded moulding; ground or pulverized sand) in open top equipment, C. L. (see Note 3), but orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb. respectively, from Ottawa, Ill., district to St. Clair, Mich.: (a) 270c; (b) 297c and (c) 270c per net ton. Routing: Via C. B. & Q. R. R. or C. R. I. & P. Ry., Chicago, Ill., G. T. Ry. or P. M. Ry., Port Huron, Mich., thence P. H. & D. R. R.

53219. To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L.; (c) sand (except naturally bonded moulding; ground or pulverized sand), in open top equipment, C. L.; from Evansville, Ind., group to Larimore, Mo., rates of (A) 180c, (B) 198c, and (C) 145c per net ton, via C. B. & St. L. Ry., East St. Louis, Mo., C. B. & Q. R. R.**

53121. To establish on roofing granules, C. L. (see Note 1), from Copley, Ohio, to Shreveport, La., rate of 517c, Waterloo, Ark., 517c, and Port Neches, Tex., 577c per net ton.

53124. To establish on roofing granules, C. L. (see Note 1), from Copley, Ohio, to Memphis, Tenn., rate of 460c per net ton.

53164. To establish on roofing granules, C. L. (see Note 1), from Darlington, Penn., and Phalanx, Ohio, to Memphis, Tenn., rate of 477c per net ton.

53163. To establish on roofing granules, C. L. (see Note 1), from Darlington, Penn., and Phalanx, Ohio, to Shreveport, La., 531c, to Port Neches, Tex., 591c and to Waterloo, Ark., 531c per net ton.

53115. To establish on sand (except naturally bonded moulding; ground or pulverized sand) in open top equipment, C. L., from Crayton, Penn., to St. Catharines, Ont.,

rate of 240c per net ton, plus increase under P. A. 4.

53117. To establish on feldspar in packages or in bulk, straight C. L., min. wt. 60,000 lb., from Seguin Falls, Ont., to Newcastle, Penn., rate of 30c and to Toledo, Ohio, rate of 27c, via all routes.

53232. To establish on crushed stone and stone screenings, C. L., in open top cars, from Marion, O., to Summit, O., 90; Pataskala and Outville, O., 95; Hanover, O., 100, being proposed rates in cents per net ton.

53227. To establish on crushed stone, crushed stone screenings or tailings, C. L., in open top cars, from Greencastle, Ind., to Fetzer, Ill. Rate of 138c per net ton, subject to increase of 10c per ton, effective December 20, 1937, via C. C. & St. L. Ry., Chrisman, Ill., B. & O. R. R., Springfield, Ill., Alton R. R.

53228. To establish on sand (except ground or pulverized), C. L., from Rockwood, Mich. (In cents per net ton.)

*Proposed Rates
Closed Open
To Equipment Equipment

To	Closed	Open
Marine City, Mich....	140	105
Marysville, Mich.....	140	100
St. Clair, Mich.....	140	105
Woodville, Ohio.....	110	85
Millington, N. J.....	340	340
Schuylerville, Va.	330	330

*Subject to increase in Ex Parte 115 (P. A. 4).

53235. To establish on sand (except industrial), and gravel in open top cars, C. L., from Woicottville, Ind., to Chicago, Ill., and points in the district, rates of 75c per net ton—single line, and 95c per ton—joint line.

53263. To establish on mortar, dry building, consisting of a mixture of portland cement, lime, slag and shale, in straight or mixed C. L., min. wt. 50,000 lb., marked capacity of car to govern if less from East Fultonham to points in Trunk Line Association territory named in C. F. A. L. Tariff 557, the same rates as currently in effect on cement, C. L.

53338. To establish on (a) sand (except naturally bonded moulding and ground or pulverized sand), in open top cars without tarpaulin or other protective covering; (b) sand, naturally bonded moulding in all kinds of equipment, and sand (except ground or pulverized sand), in closed equipment; and (c) sand, ground or pulverized, C. L., from Ford City, Penn., to points in Penn., New York, Md., Va., W. Va., Louisville, Ky., and Trenton, N. J., rates on basis of scale prescribed in I. C. C. Dkt. 22907. Route—Via P. R. R.

53382. To amend individual lines' Tariffs naming rates on lime, common, hydrated, quick or slaked, C. L., as shown below:

(a) From Carey, Genoa, Gibsonburg, Luckey, Martin, Marblehead, McVittys, Tiffin and Woodville, Ohio., to Ste. Genevieve, Mo., min. wt. 30,000 lb., 20½c and min. wt. 50,000 lb., 16½c.

(b) From Cold Springs and Durbin, Ohio, to Ste. Genevieve, Mo., min. wt. 30,000 lb., 20c and min. wt. 50,000 lb., 16c, as amended under Ex Parte 115, by providing that application of such rates will not apply for account of the St. L. S. F. Ry.

53393. To establish on dolomite, roasted (refractory dolomite, in granular form, treated or untreated, clinkered or burned to a dead state), C. L., (See Note 3), from Bonne Terre, Mo., a/o Dolomite Dolly Siding, Mo., to Ashland, Ky., 18c; Buffalo, N. Y., 20c; Cincinnati, 16c; Columbus, Ohio, 1c; Kokomo, 15c; Fort Wayne, Ind., 16c; Middletown, 16c and Portsmouth, Ohio, 17c.

53396. To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L. (See Note 1); sand, (except naturally bonded moulding; ground or pulverized sand) in closed equipment, C. L.; (b) Sand, ground or pulverized, in all kinds of equipment, C. L. (See Note 1); and (c) Sand, (except naturally bonded moulding; ground or pulverized sand) in open top equipment, C. L. (See Note A). (See Note 3), but orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively** from Ottawa, Ill. District to

Lapeer, Mich., (a) 270c; (b) 294c and (c) 250c per net ton.

Note A—Rates will not apply on shipments in open top cars with tarpaulin or other protective covering.

Southern

16036. Bituminous asphalt rock and asphaltic sandstone, C. L. Establish 510c net ton from Bowling Green, Ky., to Eagle Pass and Laredo, Tex.

16049. Limestone or marble, ground or pulverized, C. L., min. 60,000 lb. Establish specific commodity rates from Anderson, Tenn., to points in C. F. A. and I. F. A. territories, not in excess of existing rates from Sparta, Tenn.

16055. Agricultural limestone, C. L. Establish 130c net ton from Mascot and Strawberry Plains, Tenn., to Florence, Ala.

16075. Mica, wet-ground, C. L. Min. 40,000 lb. Establish 34c cwt., Cranberry, N. C., to Newport News, Norfolk, Pinners Point, Port Norfolk, Portsmouth, and West Norfolk, Va., for export.

16083. Change application of S. F. T. B. Ground Limestone Tariff 227-C by providing for rates from and to stations named in the new intraterritorial Docket 13494 class rate tariffs and refer to S. F. T. B. Tariff 700-A (Southern Group Basis), for basis for rates from and to other points.

16099. Limestone or marble, crushed, granulated, ground or pulverized and stone dust, C. L. Establish 292c net ton, Irvington and Dugan, Ky., to Mobile, Ala. Expires June 30, 1938.

16119. Wet phosphate rock, C. L. Establish transit rate of 10c gross ton from Hopewell, Fla., to Pembroke, Fla., to be dried or dried and mixed and reshipped via S. A. L. Ry. to interstate destinations.

16126. Limestone, ground, for acid soil treatment, in closed cars, C. L., min. 60,000 lb. Establish from Austinville, Va., to C. C. & O. stations, Quarry, Burton, Ford, Bankor, Miller Yard, Dungannon, Wood, Ft. Blackmore, Callahan, Greer, Starves, Hill and Rye Sove, Va., 190c; Boulder, Speers Ferry and Kermit, Va., 180c net ton.

16131. (a) Ground limestone or marble, C. L. Establish rates from Anderson, Tenn., to eastern, interior eastern and New England points made with relation to present rates from Sparta, Tenn., and Cartersville, Ga.

(b) Ground limestone, C. L. Establish from Sparta, Tenn., Cartersville, Ga., and Anderson, Tenn., to eastern, interior eastern and New England points, rates based on Riverton or Buchanan, Va., combination. Expires June 30, 1938.

16186. Lime, C. L., min. 50,000 lb. Establish 364c net ton, St. Louis, Mo., and East St. Louis, Ill., to Mobile, Ala. To alternate with present rate of 450c net ton, C. L., min. 30,000 lb.

16217. Sand, C. L. Establish 160c net ton (subject to increase authorized in Ex Parte 115), Talbird Siding, N. C., to Richmond, Norfolk and Newport News, Va.

16228. Sand (except industrial), in open top cars, C. L. Establish 135c net ton from Mentor, Ky., to Lexington, Ky.

16231. Agricultural limestone, C. L. Establish 120c net ton from Dolcito, Ala., to Florence and Sheffield, Ala.

16232. Limestone, also asphaltic limestone, C. L. Establish 440c net ton from Margerum, Ala., to Eagle Pass and Laredo, Tex.

16240. Lime, C. L. Establish from Sherwood, Tenn., to New York, N. Y., and Johnstown, Penn., 603c, C. L., min. 30,000 lb., and 486c net ton, C. L., min. 50,000 lb.

Western

D-25-62. Plasterboard, from Fort Dodge, Ia., to Kansas City, Mo.-Kan. Proposed—23c per 100 lb.

E-25-63. Lime refuse, C. L., min. wt. 60,000 lb. from Menomonee Falls, Wis., to Detroit, Mich. Rates, present, classification basis. Proposed, 185c per net ton.

E-41-235. White sand (silica), C. L. (see Note 3). In no case shall the min. wt. be less than 40,000 lb., from Hermann, Mo., to St. Louis, Mo., present 80, proposed 70; E. St. Louis, Granite City and Madison, Ill., present 92, proposed 82. Rates in cents per ton of 2000 lb.

E-41-236. Sup. 1. Stone, broken, crushed or ground, C. L. (See Note 3). From Dell Rapids, S. D., to South Sioux City, Neb. Rates: Present—160c per net ton. Proposed—96c per net ton.

E-41-237. Sand and gravel, C. L. (see Note 3), but in no case less than 40,000 lb., will apply, from Louisville and Oreapolis, Neb., to representative Missouri destinations:

	From			
To	Louisville	Oreapolis	Pres.	Pro.
Watson	90	85	70	74
Corning	110	95	90	85
Skidmore	140	110	130	100
Maryville	150	135	130	125
Westboro	130	105	120	100

E-43-53. Rip rap stone, C. L. (See Note 2), from Spencer, S. D., to Walthill and Winnebago, Neb. Rates: Present—300c per ton of 2000 lb. (W. T. L. Tariff No. 231-A.) Proposed—97c per ton of 2000 lb., same to be subject to expiration date of June 30, 1938.

Southwestern

12940. Lime (calcium), Dittlinger, Houston, Lime City, McNeil, Oglesby and Round Rock, Tex., to Colo. and Wyo. To add differentials for distance traversed through Texas-Oklahoma differential territory to the rates on lime from Texas producing points to destinations in Colo. and Wyo. currently carried in Item 265-B, S. W. L. Tariff 227-A, I. C. C. 2825.

12976. To establish on crushed stone, as described in Item 40, S. W. L. Tariff No. 162-L, C. L., from Stringtown, Okla., to Sulphur Springs, Tex., a rate of \$1.15 per ton of 2000 lb., to expire with June 30, 1938, unless sooner canceled, changed or extended.

New England

43122. Core and moulding sand (see Note 3), Everett to Lynn Mass. Present—10. Proposed—90 net ton. Reason—To enable the B. & M. to receive a haul on this traffic.

43089. Crushed stone, min. wt. 50 net tons, except that where cars of lower capacity are furnished for carriers' convenience, the C. L. min. wt. will be the marked capacity of the car, Greenfield, Mass., to Gardner-Haywood, Mass. Present 90 net ton. Proposed—60 net ton. Reason—To enable the B. & M. to receive a haul on this material.

43146 (1-R). Crushed stone, min. wt. 50 net tons except that when cars of lower capacity are furnished for carriers' convenience the C. L. min. wt. will be the marked capacity of the car, Lynn, Mass., to Woburn, N. H. Present, \$1.10; proposed, 90c N. C. Reason: To enable the B. & M. to receive a haul on this material.

Texas-Louisiana

2668-TX (File 9738-TX). Proposition from shipper to establish rate of \$3 per net ton of 2000 lb. on feldspar, C. L., subject to (see Note 3), from Llano, Kingsland and Beverly to Dallas, Texas.

2700-TX (File 10005-TX). Crushed stone from Lone Star Spur to Wichita Falls. Proposition from carrier to extend rate of 80c from December 31, 1937, to June 30, 1938.

Proponent states that it is necessary to continue the above rate beyond present expiration date because of local competition at destination in connection with construction work now in progress.

36501. Stone chips or granules (roofing granules), C. L., min. wt. 50,000 lb., from Advance and Gladhill, Penn., to Montreal, Mile End and Highlands, Que., 26c per 100 lb., in lieu of present commodity rate 30c per 100 lb., per W. M. Ry., I. C. C. No. 8429.

NEWS ABOUT PEOPLE

W. P. SABIN, for a number of years vice-president and treasurer of the Ash Grove Lime and Portland Cement Co.,



W. P. Sabin

Kansas City, has been appointed executive vice-president—good news to his many friends throughout the industry.

ERNEST M. HAMMOND has been elected president and general manager of the Gravel Products Corp., Buffalo, N. Y., succeeding Daniel E. Knowlton, who resigned. However, Mr. Knowlton will continue as a member of the board. Mr. Hammond was formerly a vice-president of the company. Adam E. Cornelius and John J. Boland, of Boland & Cornelius, members of the board of directors, have been elected to places on the official staff, but will retain their places on the board. Mr. Cornelius is now chairman, and Mr. Boland is vice-president and treasurer. Joseph F. Thomas is secretary of the company.

B. E. NEAL, president of the Neal Gravel Co., Attica, Ind., is reported to have recovered satisfactorily from a major operation. His many friends will be pleased to learn about his recovery.

F. T. (TIP) BROWN, district sales manager of the Lehigh Portland Cement Co., Kansas City, Mo., was a recent guest speaker before a joint meeting of the Chamber of Commerce, Lions and Rotary clubs at Ellsworth, Kan. Mr. Brown addressed the meeting, which was held under the auspices of the Better Housing Committee of the Missouri State Chamber of Commerce. In his address, he advocated a

town plan for every community, no matter how small or large it may be. Mr. Brown is a director of the Missouri State Chamber of Commerce, a member of the Kansas City Chamber of Commerce, and is active in the affairs of the Rotary Club.

W. JESS BROWN, president of the Dixie Sand & Gravel Co., Chattanooga, Tenn., has retired from his term of president, Engineers' Club of Chattanooga. C. E. McCaslin, district engineer, U. S. Geological Survey, succeeds Mr. Brown for the 1938 term.

H. L. KNAPPENBERGER, secretary of the Oregon Portland Cement Co., Portland, Ore., has just accepted the position of sponsor for the safe driving campaign of the Portland Cement Association during the coming months. Still further impetus is to be given to the downward trend of accident rates among cement salesmen drivers, apparent during the closing months of 1937.

GEORGE A. LAWNICZAK recently became superintendent of the Alpha Portland Cement Co.'s plant at LaSalle, Ill., on the retirement of Gus Lundborg, after a long service. Mr. Lawniczak served for many years as quarry foreman at the LaSalle plant and was superintendent of the Bellevue, Mich., plant of the Alpha company over a long period. He

has had a long service in many minor capacities as well and is one of the cement industry's distinguished safety veterans.

H. E. SHULL is now foreman of the Gifford-Hill & Co., Inc., Turkey Creek, La., plant; B. J. Collins is foreman of the Hearne and Black Bridge, Tex., plants; Archie Farr, Trout, La., is foreman at Searcy, La.; and R. C. Bullard is foreman of the Mountain Creek and Clowdy plants near Dallas, Tex. C. G. Thompson is the new service engineer on paving construction work, and is stationed at Minden, La.

DANIEL HARRINGTON, chief of the safety division of the U. S. Bureau of Mines, is largely responsible for the successful program of first aid training carried on by many cement, lime and gypsum plants since 1930. Mr. Harrington's division is being called upon again to lead the 1938 first aid program of the Portland Cement Association. Although "Dan" makes his headquarters in Washington he travels extensively and is intimately acquainted with the quarrying as well as the mining industries.

GEORGE OSHEL of the Ash Grove Lime and Portland Cement Co.'s plant at Chanute, Kan., has completed another year at the head of the industry's list for long service without accident. In August, 1938, "Cap" Oshel, as he is known, will have completed 50 years of safe working as laborer, foreman and superintendent for the Ash Grove company. Mr. Oshel was born in LaFayette, Indiana, in 1865 and moved to Kansas with his parents at the age of 10.

IVAN F. LEFORE, safety engineer of the Portland Cement Association, has just completed plans for a new cement mill safety program, which is to be offered to mill managements next month in an effort to open the industry's second quarter-century of safety with a brilliant campaign.

CLAUDE L. BAYLOR, the author of a number of well-known plans for vitalizing industrial safety activities, was recently placed in charge of safety, health and welfare work of the Louisville Cement Co., at Speed, Ind. Mr. Baylor has been with the company for a long period of years and is an active member of the Indiana legislature.

P. E. COMBS, sales promotion and advertising manager, Penn-Dixie Portland Cement Co., recently addressed the Salesmen's Club of the New York Employing Printers Association.



George A. Lawniczak

Concrete Products

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE.

An Attractive Job Increases Sales



On to Another Record Year for Builders of CONCRETE Houses!



In modern mansion or conservative cottage

CONCRETE
GIVES BEAUTY, COMFORT,
FIRESAFETY and DURABILITY

Photo by L. G. Knott

LIVABLE as well as lovely are concrete houses because they are warm and dry in winter—cool in summer. Their rigid strength prevents cracking, uneven floors, sticking doors and windows, sagging walls.

There's mutual concern for the knowledge that you and your family, as well as your dearly prized personal possessions and fine home equipment, are securely sheltered from storms and fire. Concrete doesn't burn or rust or decay. Termites can't eat it.

Moderate concrete construction adds only a few dollars to your monthly payments and those dollars come rolling back in lower upkeep and higher resale value. Often the first cost is no greater than for ordinary construction.

CONCRETE FLOORS—smooth, warm, quiet and comfortable—should be in every home. They end the dread of basement fires. They take any covering—such as wood, carpet, terrazzo and linoleum—different in every room if you like.

How to get a Concrete Home

Ask a manufacturer of concrete, lumber sales or a concrete contractor for the names of architects, builders, realtors experienced in concrete construction. Write us for a free booklet showing attractive concrete houses and how to build them.

PORTLAND CEMENT ASSOCIATION, DEPT: A2a-52, 33 WEST GRAND AVENUE, CHICAGO, ILLINOIS

In scientific laboratories, and on construction jobs, the Portland Cement Association is cooperating with engineers, architects and builders to perfect ever safer, more enduring pavements... better homes and structures... better bridges, dams, sewers and farm improvements. Helpful free brochures available on hundreds of subjects.

THE concrete home idea has caught on. 1935, 1936 and 1937 successively set new all-time high records for the number of concrete homes built. In these three years alone, more than 40,000 families began enjoying the protection, comfort and satisfaction of a concrete home.

Now is the time to cooperate with builders, architects and realtors in your community to get demonstration homes built this spring, and further sell the concrete home idea. Do this and you'll have a new constantly broadening market for your products and services.

STRIKING ADS LIKE THIS in Saturday Evening Post, Better Homes & Gardens and Holland's will continue telling your community about the advantages of building new homes with concrete walls and floors—and direct them to ask **YOU** for the names of architects, builders and realtors experienced in this fast growing type of construction

MAIL COUPON TODAY FOR HELPFUL INFORMATION

PORTLAND CEMENT ASSOCIATION

Dept. A2-45, 33 W. Grand Ave., Chicago, Ill.

Yes, I am interested in the profit possibilities of featuring concrete home construction.

Please send booklet suitable for showing prospects entitled "Why People Like Concrete Homes."

Want literature on construction details.

Tell me about your national inquiry follow-up plan.

Name

Firm

Address

City State

Concrete Products Reports Gains In Several Divisions

VOLUME INCREASE 25%

SUMMARIZING the year just ended, there has been substantial progress made in the concrete products industry. The year 1937 was a good one from the standpoint of volume of business, but more important in our estimation is the widespread acceptance that has been gained for the products of the industry.

In the concrete masonry industry in particular, a prestige has been secured that will be instrumental in deriving a

greater share of the building material market for concrete building units in years to come. National advertising campaigns, intelligent local advertising and the development of real salesmanship have had their part in bringing about product recognition.

The year 1937 has seen greater inroads of concrete masonry into types of construction where other building materials were almost universally used a few years

ago. The architect, the builder and the public are fast being educated to the natural advantage of concrete. Its permanence, its fire-safeness, its soundness and its strength are features which can and are being sold.

As a result of progressive merchandising methods, and the development of the "above ground" market, the year ended with an increase in volume of business of about 25 percent over the 1936 figures. The equivalent of 247,500,000 of 8- x 8- x 16-in. concrete block were sold. Prices were "spotty" throughout the country and probably averaged slightly lower than those in 1936.

Above Ground Construction

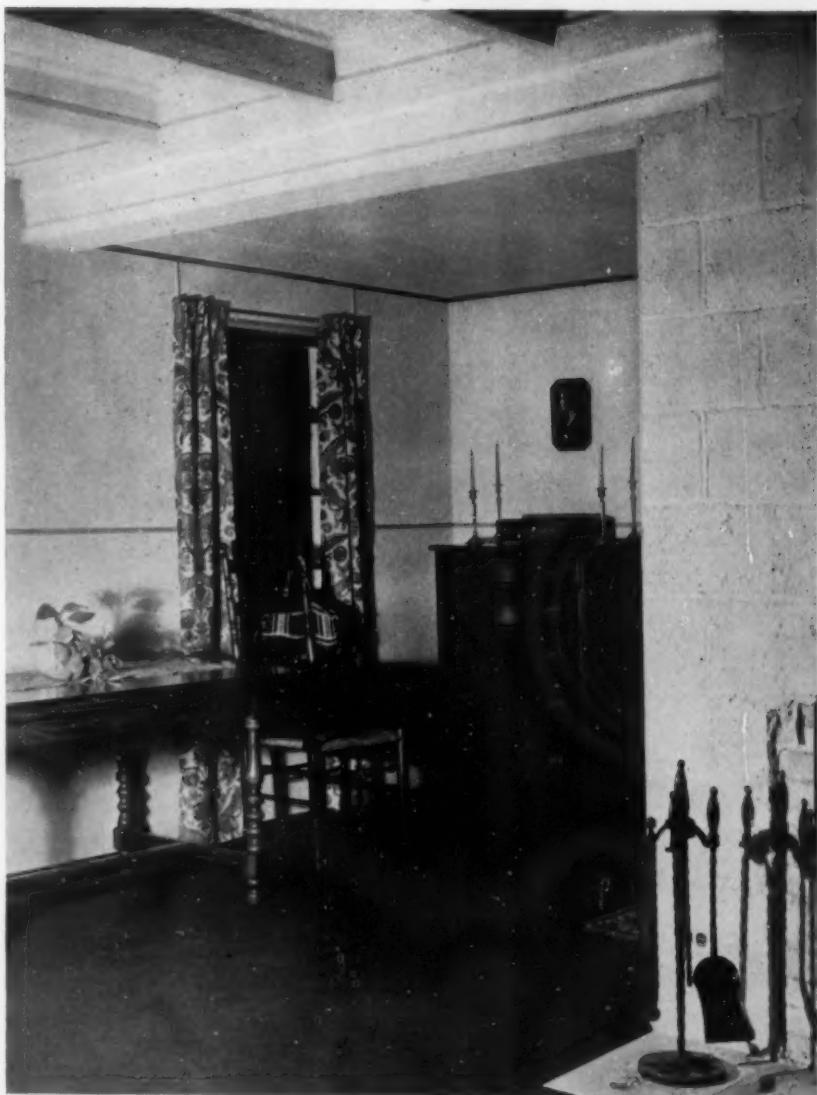
In contrast to conditions of a few years ago, a greater percentage of sales has gone into construction above ground—for concrete houses, backup, partitions, theatres and other high types of construction. More attention has been given to the appearance and quality of concrete products with the result that exposed masonry, in coursed or random ashlar pattern, is being sought not only for structural purposes but for its architectural beauty.

The movement toward concrete houses is well on the way. Figures for 1937 were encouraging, despite the business recession late in the year. National advertising conducted by the Portland Cement Association in several of the leading home magazines, and its advertising in local papers have brought returns. For the first eleven months of the year, it is estimated that about 31,000 housing inquiries came out of the advertising in national magazines.

The accompanying chart tells the progress made in concrete houses in the past three years. Concrete products manufacturers are more and more taking advantage of the opportunities offered as the result of national advertising, many of them are tying in with house building organizations and some have actually become concrete house builders.

Joist Plants Are Increasing

The precast concrete joist has played a big part in furthering the movement toward concrete houses, as may be seen



Interior of a concrete house, illustrating how effectively exposed masonry and joists lend themselves to interior treatment

from the chart. The concrete joist industry itself has enjoyed a good gain in 1937. Since 1934, 150 plants have installed equipment for their manufacture. Established manufacturers of concrete products make up the majority, but a few plants have been built especially for the manufacture of joists. We estimate that 30 to 35 plants have been equipped to make joists in 1937 and that 12,000,000 sq. ft. of concrete floors were sold.

Light-Weight Units

Light-weight aggregates including cinders, Haydite and various expanded blast furnace slags have assumed more importance with the development of above grade construction, and there has been considerable progress in the development of these aggregates. Such aggregates generally are not in competition with gravel and stone aggregates, but are mainly used where their peculiar physical qualities are desired in the newer types of construction. Units made from these aggregates, which have a cellular structure, have fireproof, acoustical and light-in-weight characteristics that have been of the utmost importance in expanding the "enlarged" market.

Such aggregates are being made more readily available to products manufacturers, although the geographical location of sources of supply are still limited. Costs of these aggregates are still too high in many localities because of freight rates, thereby localizing this business.



This barn illustrates just one of the uses of concrete masonry applicable to the farmer. Concrete is rapidly gaining the acceptance of the farmer for low cost, permanent and fireproof construction

During the year, many plants have increased their production volume and sales of improved machinery have been very extensive.

Cast Stone

The cast stone industry has seen no definite trend in 1937, but there has been considerable emphasis on improving the quality and appearance of its products. Volume of business is estimated as 25 percent over 1936 figures.

Concrete silo manufacturers climaxed several good years, in 1937, with a volume of business about 50 percent greater than in 1936. Better salesmanship is evident in this industry. The farmers are in a better financial condition than they have been for years. Crops have been good and the federal government has encouraged modernization and has loaned money extensively to farmers for this purpose.

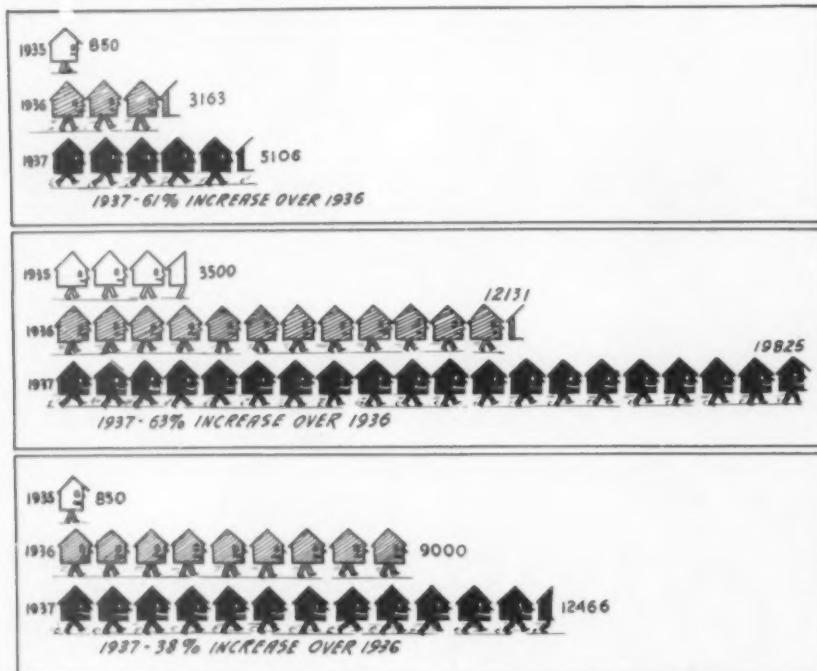
Burial Vaults

The concrete burial vault industry has been marked by a tremendous increase in the number of vibrators used in the manufacture of vaults. The trend is toward denser concrete and practices which will insure a product highly resistant to water. Business conditions throughout the country averaged about 7 percent better in 1937 than 1936. The much improved conditions in some localities were offset by reductions in other sections.

Pipe and Drain Tile

Figures are as yet unavailable on the status of concrete pipe but this branch of the industry is probably the only one where the year 1937 saw a decrease in comparison with 1936. The year 1936 had been unusually good and the volume of business exceeded even that done in 1929. The downward movement is of course due to the slackening off of WPA and PWA activities. Federal aid in financing these projects was instrumental in making the previous year one of the best in the history of the pipe industry.

The succeeding articles in this issue deal with new developments and accepted practices in manufacturing and merchandising all types of concrete products.



This chart shows the progress of the concrete house movement over the past three years. Reading from top to bottom are the figures on concrete housing units with concrete structural walls and concrete floors, the number of housing units with concrete structural walls and without concrete floors, and the number of housing units having concrete floors with various types of wall construction

Progress in Manufacturing and Merchandising

CONCRETE BURIAL VAULTS

DURING THE MONTHS of November and December a survey was made by the National Concrete Burial Vault Association so that statistical data might be compiled with relation to conditions in the industry. In certain regions there has been a decrease in volume of business. In some cases local economic conditions (strikes and shut down manufacturing plants, storm swept areas and depleted harvests) accounted for the loss. In other cases the trouble seemed to result from the business tactics and policies pursued. Small gains were noted in many sections of the country, moderate ones in some others, and exceptionally large gains in only a few. The figures show that the industry was ahead in business volume for the first ten months of 1937 as compared with the same period for 1936. The average gain was slightly above 7 percent.

It has been possible to check a large number of the industries showing the greatest loss of business. Aside from those where local economic conditions were responsible, the fault lay primarily with the poor product with which the manufacturer was trying to "get by".

Trend Toward Vibrated Concrete

Vibration has received a great deal of attention from the concrete vault industry. In 1937 there was an increase of more than 100 percent in the use of vibrators. It has been found that by vibrating, from $\frac{1}{4}$ to $\frac{3}{4}$ cu. yd. more material may be crowded into the same cubic area. This additional material makes a stronger and a denser product. The growing adoption of these methods clearly shows a disposition on the part of an increased number of manufacturers to regard the betterment of the product more important than the saving of the dollars invested in machinery and the extra material consumed. It might be said here that to succeed with vibration it must be intelligently applied. Investigation and experience have shown the difference between specimens where correct and incorrect methods have been used.

The vacuum process of extracting excess water from fresh concrete is the newest of the recognized processes. While this method also entails a moderate expenditure for the equipment, its possibilities for making better burial vaults and saving in time consumed in

As Reviewed by

RALPH W. MEAD

Secretary, National Concrete Burial
Vault Association

curing and more frequent use of the molds is recognized. This method was successfully demonstrated last October in the laboratory of Ohio State University at Columbus, Ohio, during the sessions of The Ohio Concrete Burial Vault Convention. This demonstration received much attention, and was most favorably commented upon not only by the vault manufacturers but by representatives of allied industries and by those in attendance from Ohio State University.

The processes of the application of asphalt to concrete are receiving much consideration and publicity. Some manufacturers are casting the integral asphalt on the walls of the vault. Others are applying a solvent asphalt with a brush or spray. Much interest is being shown in the claims for the virtues of the natural or mined asphalt as compared with those of the asphalt obtained as a by-product from oil companies. Steam curing has attracted some manufacturers and plants have been equipped with the necessary devices. Tests have shown a marked increase in early strength with this type

of curing, and a more rapid use of the forms is possible.

New Plants and Modernization

Several new plants have been built in 1937 and many have made additions and improvements. In almost every case, show rooms have been included in the new building and rebuilding programs. Another noted advancement is the betterment of equipment. New molds that permit greater ease in handling have been developed. Trucks have been constructed for the better servicing of vaults. Many have cabinets built in to contain certain units of the servicing equipment. Some have adopted all-panel bodies concealing not only the equipment but the vault as well. New lowering devices, chapel tents, grave linings and other cemetery service accessories have been added to the equipment.

Through their officers, the members of The National Concrete Burial Vault Association are keeping in close touch with the Portland Cement Association laboratories. Laboratory research has resulted in members avoiding many impractical and high-pressured sale schemes. Members also have received the benefits of the latest developments in what are recognized as proven processes.

The day is past when the owner of a wheel barrow, a trowel and a mortar box can gain recognition among reliable funeral directors, even though he may sell at cut rate prices. His only hope is the fellow who doesn't care and thinks "the vault is buried, why waste my extra profit on a good vault," but these funeral directors are also passing from the scene. The day is past when the purveyors of systems, secret formulas and trick contrivances can hoodwink the member manufacturer, for, through his association membership he is aware of the opportunity to get first hand knowledge of everything worth while and he can have prompt reports on anything that concerns his business.

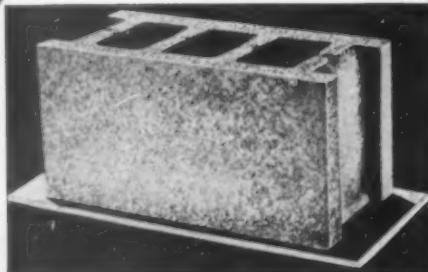
Through advertising under the sponsorship of the Association, the funeral directors and the public are being told of the worth of *correctly made* concrete burial vaults, and the demand will be for better made and better serviced vaults. The scientific age is here and the buyer is buying on the basis of scientific standards.



Ralph W. Mead

BEST QUALITY—LOWEST COST

FULLY PRESSED TOP



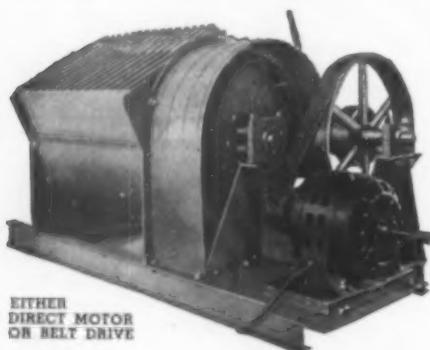
TOP, CORNERS and EDGES
TRUE and PERFECT as
CUT STONE

The Fully Pressed Top is the greatest Profit Earning improvement in Concrete Masonry Units ever made in the history of the industry.

These Highest Quality units COST NO MORE TO MAKE. They COST LESS TO SELL because they fill a definite demand. They are just what architects and builders have always wanted, but have never been able to get until they were produced on Besser Plain Pallet Strippers. An inherent feature of Besser Plain Pallet Strippers makes the FULLY PRESSED TOP. There is not only no added mechanism, but this important feature is due to the further simplification of what was before the most simple block machine ever made.

BESSER BATCH MIXERS

In All the Standard Capacities
5, 12, 18, 25, 30, 40 and 50 Cubic Feet



Besser Manufacturing Company are owners of all patents ever granted on concrete stripper block machines using plain pallets. These patents completely cover the basic Plain Pallet Stripper principle. No firm or individual is licensed or allowed to make machines under any of these patents.

BESSER PLAIN PALLET STRIPPERS

FULLY AUTOMATIC—3 Models—Capacities: 2000 to 4000 units per day.
SEMI-AUTOMATIC—4 Models—Capacities: 1000 to 2000 units per day.
POWER OPERATED with Hand Controls—2 Models—Capacities: 500 to 1000 units per day.
MULTI-MOLD—Hand Operated—Capacity: up to 300 units per day. For manhole blocks, brick slabs and small cored units.
AUTOMATIC BRICK MACHINES—Capacities from 10,000 to 50,000 units per day. For brick, slabs, coal cubes and other small units.

Write for Besser Plain Pallet Stripper Catalog

BESSER MANUFACTURING CO.

COMPLETE EQUIPMENT FOR CONCRETE PRODUCTS PLANTS

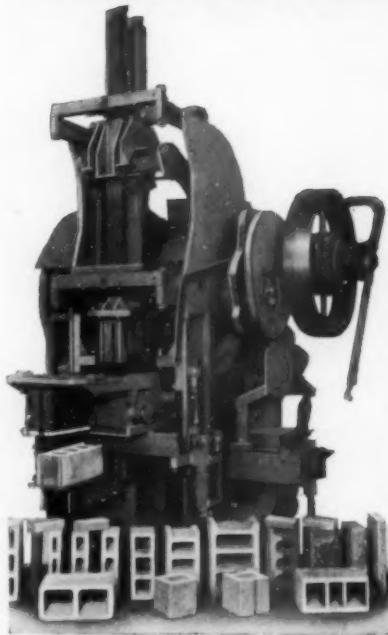
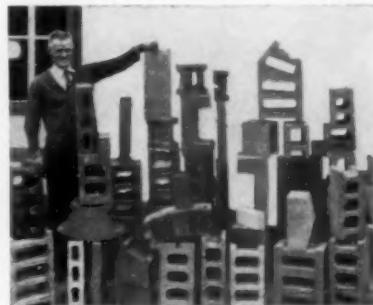
Complete Sales and Service on BESSER, ANCHOR, CONSOLIDATED, IDEAL,
HOBBS, UNIVERSAL, PORTLAND
202 38TH STREET

ALPENA, MICHIGAN

EVERY CONCRETE PRODUCTS PLANT NEEDS A BESSER PLAIN PALLET STRIPPER

You can make any number of different units, add new units, or change air space and shell thickness when desired, without any expense for new pallets. In the average plant this saving in pallet cost is more than the price of a Besser Plain Pallet Stripper.

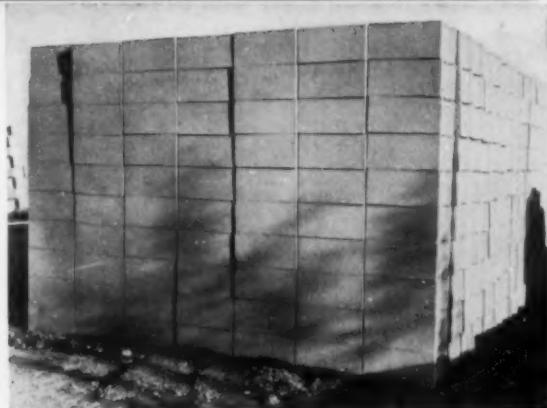
Mr. Ellis of Ellis Concrete Products Company, Bridgeport, Pa., shows 35 different units which he makes on ONE SET OF PLAIN PALLETS.



KEEPING IN STEP WITH PROGRESS



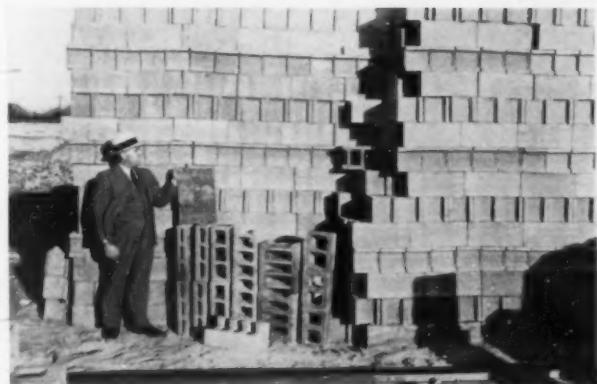
This pile of FULLY PRESSED TOP blocks was made by Mr. Fred Quintel of Detroit, Mich. on his Besser Plain Pallet Stripper. Blocks like these please the buyer.



Mr. Fred M. Leach, long time Besser salesman admires one of those FULLY PRESSED TOP blocks. The picture shows the perfect edges and corners. Mr. L. E. Edlin, another Besser salesman is holding one of the plain pallets on which all sizes of units are made.



In Milwaukee Otto Ladwig & Sons have been making blocks for years on Plain Pallets with Besser Plain Pallet Strippers. The blocks shown above were all made ON ONE SET OF PLAIN WOOD PALLETS.



Mr. Frank Romano of the Rhode Island Cinder Block Co. of Providence, R. I. makes these FULLY PRESSED TOP cinder units on a single set of plain pallets. Perfection of product and economy are notable results.



S. B. Lawrence & Co., of Lancaster, Pa. make only an average variety of units, but their saving in Pallet cost has been a big item in their favor.



In Metropolitan Boston the Freedman Brothers make a large number of different units on ONE SET OF PLAIN PALLETS. Plain Pallets have saved them many thousands of dollars.

EVERY CONCRETE PRODUCTS PLANT NEEDS A BESSER PLAIN PALLET STRIPPER

Advertising and Publicity Has Boosted Business

SELLING METHODS THAT "CLICK"

By STAFF EDITOR

THE MANUFACTURER of concrete products who "stepped out" in 1937 was the one who controlled product quality, recognized the advantages of favorable publicity and applied sound principles of advertising and aggressive salesmanship. These are the essentials for any effective merchandising program. The industry has found itself in the midst of a drive for business in competition with other materials, now that it has gone after housing and other types of building construction above grade.

This is not only true for the large manufacturer of concrete products, but also for the small producers of concrete block, the manufacturers of concrete pipe, concrete burial vaults and other cement products. They have become more sales minded. The net result is a greater share of the available volume of business than was their lot a few years ago.

Concrete Residential Construction

Manufacturers of concrete masonry units have been particularly active in the promotion of concrete residential construction, and in merchandising concrete masonry for backup and for ex-

posed walls in the larger types of buildings. This is where the competition of other building materials has come in and marks the time when manufacturers of concrete masonry had to become salesmen.

The national advertising campaign conducted by the Portland Cement Association in national home magazines is arousing widespread public interest in concrete construction, and many prospects for homes have materialized. Advertising was directed toward the prospective home builder and emphasized the permanence, durability, resistance to termites, firesafeness, low maintenance costs and structural advantages of concrete construction.

The follow-up of these leads and the cultivation of other prospects is the job of the concrete products manufacturer who desires to broaden his markets. He has had to fight against inferior types of construction and educate the public to put first class construction first.

Local advertising, demonstration homes, newspaper publicity, cooperation with builders and architects and close follow-up of leads are bringing profitable returns to the progressive manufacturers. These concerns are paying closer

attention to product quality control and service is considered of utmost importance.

Advertising Is Local in Character

Advertising is generally directed to the local market since the concrete products industry is local in character, and shipments are rarely made to exceed a radius of 200 miles. Advertising in the daily newspapers and in other local mediums is usually found to be profitable and an economical means of reaching a great number of prospects. In the larger cities newspaper advertising rates are high for the proportion of the circulation to which advertising is directed, and the industry as a whole cannot afford to pay for the circulation which is not interested in housing. It has been found profitable by many manufacturers in large communities to advertise in the home-building section of these newspapers and in the weekly real estate papers. These publications, as a rule, reach a large percentage of the prospects to whom advertising is directed.

In advertising, whether it be directed to the prospective home builder or to the architect and building trade, maximum benefits have been derived where an outstanding job using concrete masonry can be publicized. By outstanding, we mean a demonstration house or other structure which has distinctive construction and appeal to which concrete products has contributed a major part.

Cooperation With Builders

In sections of the country where concrete houses are making greatest headway, manufacturers of concrete products are as a rule working in cooperation with builders and architects who have been thoroughly sold on concrete masonry construction. The products manufacturer has sold them on the merits of concrete masonry, emphasizing the fire-resistant qualities, sound absorption, low maintenance and durability. Financing agencies such as building and loan associations, banks, mortgage companies and the Federal Housing Administration are also being sold on the merits of this construction. Their endorsement of a type of construction is of



Interior of the new Circle theatre in Detroit, featuring cinder concrete masonry construction. The ability to adapt concrete masonry effectively to architectural treatment will sell more and more of the better types of large construction illustrated above.



The first of a number of concrete masonry homes being built by J. J. Collins of the Universal Cast Stone Co. at Joliet, Ill. Mr. Collins sells concrete homes rather than the various types of concrete units which he manufactures.

course necessary in any extensive house building program.

In some cities, these organizations have been made "concrete house conscious" through the use of newspaper and placard advertising, and sometimes by direct mail. In other localities this part of the selling job has been given impetus by general housing meetings to which builders, architects and contractors are invited. The Portland Cement Association, through its field staff, is rendering invaluable assistance in cooperating with the concrete products manufacturer at these meetings. In Kansas City, Mo., for example, the speculative builder was originally interested in concrete masonry by proving to him that concrete houses could be built and sold at a profit. Now Kansas City has several builders who are building concrete masonry houses for resale.

After a builder has been sold on the advantages of concrete construction much of the responsibility for the sale of concrete masonry units falls on his shoulders. Therefore, it is important that he be "sales-minded" and have an adequate sales force to follow up leads. Otherwise the market will not be thoroughly developed.

Demonstration Houses Bring Sales

Demonstration houses have without question proven invaluable in arousing the interest of the general public and in building up a prospect list. Model homes entirely handled by the concrete products manufacturers have been instrumental in lining him up with the builder and architect who will later push his products. These houses give the concrete products manufacturer an opportunity to dramatize his materials and arouse a genuine public interest in them. By having a prominent local builder cooperate in building a model house, favorable attention can be gained and a real opportunity is offered to demonstrate product quality and the advantages of masonry construction.

Selection of a sponsor with a good local reputation naturally will add much to the success of the project. Possible sponsors in this classification are builders, real estate companies, the local newspaper, utility companies, department stores, etc. The sponsor should be one that has the full confidence of the public and whose name will serve as a favorable endorsement. A demonstration house opened for inspection under proper sponsorship and which is of popular architectural design and emphasizes good construction, will generally bring the desired results if properly publicized. A good opportunity is afforded the producer to play up structural features to advantage by leaving areas of the walls and ceilings exposed or unfinished.

Advantages of a demonstration house and other publicity are very often emphasized to attract the general public. It has not been found difficult to interest the local newspaper to cooperate editorially in conjunction with paid advertising announcing the opening date inspection, if the house has interesting features which can be played up and which are well illustrated.

Some of the more progressive manufacturers of concrete products have made it a point for the demonstration house to dominate a particular building section issue of a local paper. This can usually be done where cooperating concerns will run ads on other products used in the house, such as electrical and plumbing fixtures, insulation, waterproofing and other accessories.

An Example of Good Publicity

A good example of such publicity appeared in the December 3, 1937, issue of the *Greater Detroit Builder and Realty News*, in which the recently completed Circle theatre was featured. Cinder block served several purposes in the construction of the theatre, and were used to advantage more extensively than

in any other structure of its kind built to date. The front and back pages of this weekly 4-page publication were completely dominated by a description of this theatre, using four large cuts to illustrate the architectural beauty of exposed cinder block. Special emphasis was given to the use of special cinder concrete units to relieve the monotony of a large wall expanse and to the ideal acoustical properties of the auditorium. Cinder Block, Inc., advertised its products in the same issue of the paper.

Incidentally, in the same issue considerable space was given to articles describing the "Ideal" home under construction in Detroit. The Detroit Concrete Products Association is sponsoring a concrete low-cost "Ideal" home and good advertising space was placed by manufacturers of heating equipment and insulation calling attention to the fact that the Detroit Concrete Products Association had selected their products for the model house. Such cooperation will convince the editor that the project is distinctive, and will command the attention of others.

Building Shows Present an Opportunity

Another "bet" which shouldn't be overlooked is the building show. The concrete products manufacturers of Detroit certainly took advantage of the opportunity to present their materials at the Detroit Builders' Show early in 1937.

This was an outstanding example of cooperative selling effort if there ever was one. Twenty-four manufacturers of the Detroit Concrete Products Association worked together to sell concrete masonry rather than their own particular product. Among them were represented manufacturers of gravel, Haydite, slag and cinder block.

Officials of the show were first convinced by the group that the model house should be constructed with exposed concrete ashlar units painted with white cement paint and with precast joists for the first floor. This house was given away at the conclusion of the show.

The Association members then took 14 booths at the show, prominently located so that practically every visitor would pass by the exhibit. Particular care was taken that all types of concrete masonry construction applicable to the home were demonstrated. A number of local builders and specialty manufacturers cooperated with the block producers in making the show a success. Sales of many thousands of units after the display were directly traceable to participation at the show. The exhibit really paid off.

An outstanding example of merchandising by an individual is the program

carried out by J. J. Collins, Joliet, Ill. Mr. Collins recognized that to get the house market, prospects must be sold on the idea of a house rather than the units themselves, and he accordingly is merchandising houses rather than products. Mr. Collins, owner of the Universal Cast Stone Co., Joliet, carefully planned a program last August that brought almost immediate returns.

First, a tract of land was acquired sufficient for 30 homesites in the attractive Clearview subdivision in Joliet. The location was chosen near to schools, playgrounds and other conveniences so that his houses would not be limited in their appeal because of objections to the site.

A 5-room, two-story concrete house was constructed on one of the 50- x 125-ft. lots, complete with basement, using exposed Waylite blocks and precast joists. Particular attention was given to workmanship in laying up the walls, to capitalize on the attractiveness of concrete masonry. Construction was

personally supervised by Mr. Collins. Exterior walls were painted with two coats of washable white cement paint. To give an idea of how the house would appear, it was thoroughly landscaped and equipped with venetian blinds and quality furniture.

In designing the house, particular care was taken to incorporate details of construction that would meet the approval of the Federal Housing Administration so that prospective homeowners would have available loans insured by that organization. The house was "tagged" at \$4700 to include carpeting, linoleum, hot air heat and the lot.

When all was in readiness, a half-page illustrated advertisement was run on a Sunday in the building section of the *Joliet Herald News* announcing that the house would be open for inspection that day. In addition to this advertising a small ad was run by the Universal Cast Stone Co. and other concerns had space advertising accessories that went into construction of the house.

This type of construction was new and

distinctive in Joliet with the result that generous editorial support was readily given to the project. Three thousand people inspected the house that day and 1000 each night for the next week. Flood-lights were used to advantage in the evening in directing people to the house. Each person was asked to register and the prospects list was sorted out and indexed for subsequent follow-up. The original house was purchased very shortly, and according to latest reports several others have since been sold.

Calendars—Direct Mail— Blotters

Other methods of advertising products have also been found successful. Some manufacturers distribute attractive calendars to contractors or builders, with a framed picture of his outstanding job using masonry. Post cards and blotters with a good house picture as well as direct mail advertising are other economical ways to keep concrete products constantly before the prospect. Practically all producers who are selling the enlarged market, index the prospects resulting from the Portland Cement Association national advertising and regularly scan the Dodge and other construction reports for leads.

It is somewhat unusual when concrete products are advertised over the radio, but in several cases it is being done to advantage. Elmer Strong, La Crosse, Wis., in addition to advertising regularly in the local papers, has been successfully advertising over the radio. In Mr. Strong's case, a scheme was worked out that simplified the matter of payment. Part of the cost of masonry used in construction of a new transmitter station built by the local radio station was taken out in radio time. Mr. Strong prepared his own script.

However, the radio offers greater opportunity where a special product, not manufactured extensively, is being merchandized. An example is the concrete land packer manufactured by the Kirkham Concrete Products Co., Topeka, Kan., and the Grundemann Construction Co., Humboldt, Kan. In 1937 it was found profitable to broadcast these items to the farm trade. Three carloads of land packers were sold during the summer.

At least one manufacturer, the Badger Concrete Co., Oshkosh, Wis., has found it profitable to have an advertising agency prepare and place its copy. This was done to eliminate uninspired preparation of advertising material. Advertising copy prepared by the Portland Cement Association is taken and correlated into a local campaign.

With the development of a live prospect list, it follows that sales are pro-

(Continued on page 76)

It Pays to Own A Cinder Block Home

BECAUSE Cinder Block is fire-proof, damp-proof, and Termite-proof!—And it is adaptable to any architectural style or design. When you build a Cinder Block home, depreciation and upkeep are less—livability is greater.

Complete information about low-cost Cinder Block homes is yours for the asking.

Chautauqua Cinder
Block Co.

Jamestown, New York

An excellent example of advertising by a manufacturer of concrete products in which he forcefully places emphasis on one of the many advantages of concrete masonry construction

the TERMITES ARE COMING for DINNER



Will They Eat YOU Out of House and Home?



Some Intimate Details of the READY-MIXED CONCRETE BUSINESS

Discussed by R. V. WARREN and ALEXANDER FOSTER, JR.

Secretary-Treasurer, Ready Mixed Concrete Association
of Metropolitan Pittsburgh and Vice President of the
Warren Co., Philadelphia, respectively

THE STATE OF PENNSYLVANIA has anticipated action by the government of the United States and adopted a 44-hour week labor law with minimum rates of pay, effective last December 1. One of the industries hardest hit, if the law is rigidly enforced, is that of producing and distributing ready-mixed concrete. What follows is part of a brief submitted by the ready-mixed concrete industry of Pennsylvania, asking for exemptions from this new act; it should prove helpful to the industry in general in combatting similar state laws—and very probably some kind of a national law:

Number of Plants

Today, after about a score of years of operation, the ready-mixed concrete industry of Pennsylvania has grown to where it includes approximately 68 manufacturers; 28 of these or 40 percent have their headquarters in the city of Pittsburgh or in municipalities close-by. The remaining 60 percent are scattered throughout the state, practically all in the larger cities: Philadelphia, Harrisburg, Reading, York, Allentown, Scranton, Wilkes Barre, and others. Some of these manufacturers retail "central-mixed" concrete; others, a majority in number, merchandise "truck-mixed" concrete.

Number of Employees

These 68 manufacturers employ about one thousand persons. Exclusive of office help and management, the principal employees are hoisting engineers, truck drivers, semi-skilled and common laborers, with truck drivers much in the majority. The latter employee is not an average truck driver, but one who has, through years of training learned the knack of what proportions are necessary, how much water needs be added to make the right consistency, and how long a time is to be used in mixing. It takes months of teaching an average truck driver before he becomes an efficient ready-mixed concrete truck driver. In the two largest cities, Philadelphia and Metropolitan Pittsburgh, the majority of common labor, semi-skilled labor, truck drivers, and hoisting en-

gineers employed in manufacturing ready-mixed concrete are members of their respective local craft unions, chapters of the American Federation of Labor.

Capital Invested

The capital invested by these manufacturers approximates \$7,000,000. The principal items of investment are plants, where the bulk materials are stored, proportioned, and loaded into trucks, also mixed at central-mixed plants; and automobile trucks, designed either to mix the ingredients or to agitate the concrete in transit to the job site. The trucks which mix in transit range in carrying capacity from 1 cu. yd. to 4½ cu. yd.; trucks used in hauling the central-mixed concrete have somewhat larger carrying capacities. Individual manufacturing company's capital investments vary widely, one having over \$3,000,000 in plant alone, with another \$450,000 in its trucks. From these, the investment dwindles down to the manufacturer with but a single truck of 1 cu. yd. capacity.

Industry's Justification

Although the industry, when compared with other industries, lacks largeness in number of manufacturers, number of employees, and capital invested, it has become extremely important to present-day construction. Its commodity is used somewhere in the majority of construction work whether it be a building, a sidewalk, a roadway paving, a reservoir, a bridge, or other structure, and ready-mixed concrete has in this construction eliminated waste, helped the safety-first movement, and provided some employment in what used to be barren winter months. The quantity of ready-mixed concrete manufactured by the 68 manufacturers in Pennsylvania for retail sale in 1937 probably exceeded 500,000 cu. yd., which is an increase over previous years, largely brought about by a recognition that in most instances the economic way to buy concrete is to buy it ready-mixed. In money this yardage will represent gross sales of over \$4,000,000.

Industry's Handicaps

The manufacturers of ready-mixed concrete are faced with many elements beside perishability of their product; the weather element plays an important part. A rainy day usually spells gloom to the manufacturer. An illustration of this is the case of a manufacturer in the city of McKeesport. This past October he had orders from contractors for delivery of ready-mixed concrete on a certain day that not only would require every one of his 7 trucks but the leasing of 11 trucks of other manufacturers. On the day before delivery he prepared to put 18 ready-mixed trucks to work the first thing in the morning; the break of morning brought rain and with it telephone calls from the three contractors asking that no deliveries be made that day. As a result the manufacturer had to dispense with the services of the trucks for that day; for the leased trucks he was required to pay running time both ways—going from and returning to their headquarters.

Short Orders Filled

Besides the weather element it has been necessary to recognize that the buyer usually gives extremely short notice of his requirements and that service is expected at the time requested, whether that time be 6:00 a.m. in the morning, 11:00 p.m. in the evening, Saturday afternoon, Sunday, or on a Holiday. Usually the notice narrows down to 24 hours; more frequently it is a telephone call an hour in advance. Sunday might seem to be an unusual day for service; it is not, however, in industrial centers like Pittsburgh, for most of the mills and factories make their repairs and perform their maintenance work on Sundays. Seldom is this work planned much in advance.

To give some idea of this Sunday work and its uncertainty, there has been prepared a tabulation of one manufacturer's Sunday service. On two Sundays no service was rendered; on six Sundays one truck driver was sufficient for the service required; on the Sunday which shows the distribution by purchaser, 4 truck drivers were employed, one work-

ing 8 hours, one 9 hours, one 10½ hours, and one 11 hours, a total of 38½ hours. This service-when-wanted has provided growth in the use of the product, which in turn has provided employment.

Irregular Hours Essential

In addition to the weather element and the service-when-wanted element, the manufacturer has learned that there is no certainty as to how long a time it will take to deliver a certain load of ready-mixed concrete. Breakdowns and delay in unloading have never been controlled.

To cope with the weather element, the service-when-wanted element, the uncertainty of time used in delivery, and uncertainty of any deliveries for lack of orders, requires flexibility in the work hours of the employees, especially those employees directly engaged in the manufacture and delivery of the product. If the weather precludes delivery, then there is loss of time for the employees. If the service-when-wanted requires early morning delivery, evening delivery, Sunday or Holiday deliveries, then there may be an early starting hour, a late quitting hour, or work on days ordinarily not recognized as work days. Overtime, by reason of the nature of the business, is as frequent as lost time. The permitting of employees to work more hours than those of a normal work day is a practice that has led to a friendly spirit of co-operation between employer and employee. Were it not for the practice of permitting the employees to make hay while the sun shines, their average yearly pay hours, especially those of truck drivers, would be considerably less than those of the employee engaged in factory work whose hours are not subjected to the weather elements.

Union Agreements Made

Union agreements entered into by ready-mixed manufacturers recognize by their hourly lee-way provisions, that there must be flexibility in work hours of the employees. In the truck drivers' and laborers' agreements there are:

No maximum daily hours

No maximum number of week days but a recognition that in Pittsburgh 48 hours is a fair week's employment at the regular hourly rate, and in Philadelphia 50 hours. Hours beyond those, during week days, are to be compensated on a time-and-one-half basis. Sunday and Holiday hours are double-time compensation.

Exemptions Asked

(Here follows extracts of the 44-hour law, exhibits to show how it would render the present service given by the industry impossible, and to show how truck drivers' earnings would be greatly

reduced. Under the law the state labor department is given authority to make exemptions.—The Editor.)

The ready-mixed concrete industry seeks the following variations or exemptions:

First: an unlimited day, or if limited, a maximum day of 12 hours.

Secondly: an unlimited week in so far as the number of days of employment, at least during the months of April to November inclusive.

Thirdly: the restriction, if the unlimited day and week as herein requested are granted, of maximum number of hours of an employee to the aggregate hours represented in a year's work of 44 hours per week for 52 weeks.

Your petitioners further pray that the department recognize at the same time for the ready-mixed manufacturers, the lee-way provisions of Section 5B of the Act which reads:

"In any place of employment wherein, owing to the character of the work, it is difficult to fix the hours of employment weekly in advance, the Department of Labor and Industry, on application, accompanied by evidence, which satisfies it of the necessity therefor, may grant a permit dispensing with the schedule (Posting of Schedule of Hours) required in this Section."

Under this authority, the petitioners, the ready-mixed concrete manufacturers, seek to dispense with the posting of daily and weekly working hours.

If these requests be granted, then it is believed that the ready-mixed concrete industry of Pennsylvania can function to meet its trade; present employees will obtain a fair yearly wage, and in all likelihood by reason of the restricted maximum aggregate yearly hours of employment, new employees will be engaged.

Selling Methods That "Click"

(Continued from page 74)

portionate to the ability of an adequate sales force. Personal contact and frequent repeat calls by salesmen trained in selling the particular product are necessary to get the business. A number of products concerns employ engineer-salesmen who are well versed in construction methods and are capable of giving the maximum in advice and service.

Service on a job has proven to be of utmost importance in gaining good will and repeat orders. Service after a job has been sold should include cooperation with the builder or contractor in production and delivery and an adequate stock must be kept on hand at all times. It is well to remember that a good first job, well-serviced, has in a number of cases established concrete masonry as the accepted type of construction for a particular type of building.

An example of the kind of service that is bringing results is the policy set by Stone Tile and Supply Co., Roanoke, Va., a concern that sells and services jobs over considerable of the state of Virginia. Six salesmen are employed, four of whom are in the field. Their function is not only to sell but to cooperate and to help the builder. Repeat calls are constantly made while the building is in progress of construction. These men also see that proper use is made of concrete products. This is an important point, since a good job, properly laid up, is the best selling point that can be had. On the other hand, the builder, if he carelessly erects a building, can undo a lot of the good will built up for concrete products.

Another form of service that will actually create sales and bring repeat orders for masonry construction is service at the plant. Keep a complete stock

of unit sizes and specials that can be used in all types of structures for which concrete masonry is adaptable. Be prepared to give the customer what he wants. If he knows that you are prepared to meet all his needs for masonry, increased sales will materialize in the long run. The Iowa Concrete Crib and Silo Co., Des Moines, Iowa, carries in stock units which seldom move but are considered just as important as other units.

Stock Sizes

This concern and others are finding that it pays to have an engineering department to help promote sales and to render service. Working drawings are made for all special units, and each unit is treated as an engineering problem. The policy of these companies is to be able to make the units which will fulfill the architect's visualization of a well-designed and artistic structure. The engineering departments also function in making setting up plans for the contractor and actually create ideas and shapes of units to suggest to architects how concrete units can effectively be used to bring out his ideas. Units must be adapted to extant architectural styles. Special products such as arches, window facings, scalloped block and others bring a good price and open the way to sales of more standard units.

As another service and source of additional business, the progressive manufacturer should build up a supply of items to sell to the concrete house builder, including joists, lintels, insulation, sills, stuccos, paints, metal windows, reinforcing steel, doors, etc. In this way he eventually is looked upon as the source of supply and is enabled to secure a bigger percent of the total outlay for any particular job.

Interesting Progress Made In Concrete Research

New Products-Manufacturing Methods

By BROR NORDBERG

CONCRETE PRODUCTS MANUFACTURE has improved very perceptibly in recent years and, in general, the products placed on the market are of much better quality. The industry has progressed to the point where products are now being manufactured and cured by the application of sound engineering principles.

In the past the industry has suffered much from the mistakes of manufacturers who offered for sale products far below standard and which were subject to marked volume changes after delivery to the job. Manufacturers, in a number of cases, were inclined to look upon curing as a necessary evil rather than as a vital part of the manufacturing process. This type of manufacturer is greatly in the minority today.

Machinery Has Been Improved

This trend toward quality products can be attributed in part to research by manufacturers of equipment and to the studies carried on by the trade associations and the Portland Cement Asso-

ciation as well as to the demands today for higher quality in building materials.

Concrete mixes for all products are being designed with more regard to the water-cement ratio. The grading of aggregates has had thorough study in recent years, and the importance of fines in making high strength, dense concrete is being recognized.

Vibration and Segregation

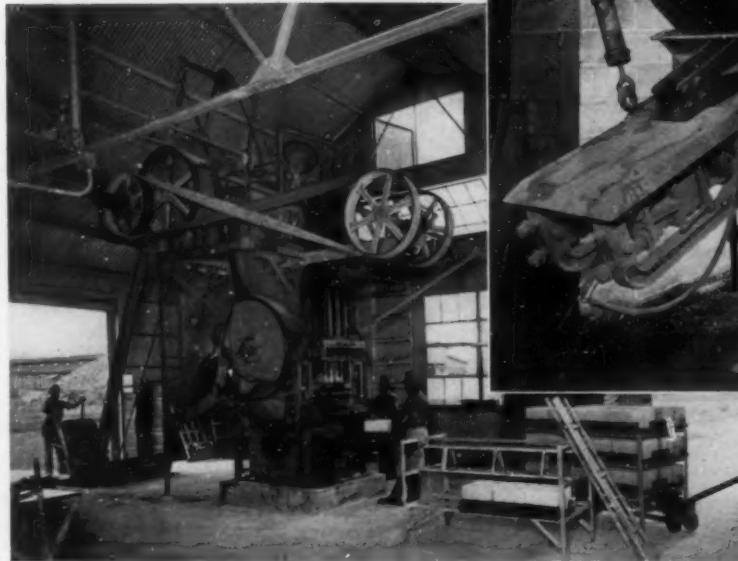
A number of improvements have been made by machinery manufacturers in recent years which have been instrumental in giving to products greater strength, uniformity of texture and sharp, straight edges. Many concerns, both small and large, have installed large concrete block machines which are fully automatic in operation. Capacities of six or seven 8- x 8- x 16-in. standard units per minute are not unusual.

Most of the machine-made concrete products are being manufactured by tamper-type machines, but considerable study is being made on the adaptation

of vibration to precast concrete. The vibrating table has already been found satisfactory for the manufacturer of precast concrete joists and is now the standard practice. High flexural strengths and resistance to shear are being obtained in these units by vibration. It is evident that considerable experimentation is being done by individual plant operators in the use of vibrating tables, judging from the wide range in the number of pulsations and the variations in amplitude of vibration in actual practice.

Segregation is the variable which must be reduced and controlled if the vibration method of placing concrete is to find any widespread acceptance. The Stearns Manufacturing Co., Adrian, Mich., will soon announce a development in the use of vibration that applies the principle of "limited amplitude" vibration to control segregation. It is claimed that this process is effective with the use of a low water-cement ratio and a proper fineness modulus. It is further claimed that concrete units so vibrated have the advantages of vibrat-

Below: Interior of the Choctaw Culvert and Machinery Co. plant at Memphis, Tenn., illustrating a modern and efficient plant layout. The unitized equipment shown consists of a Besser Plain Pallet Stripper with a Besser batch mixer. To the left is the skip hoist for elevating materials to the mixer



Above: Modern cinder crushing and handling equipment by Jeffrey installed by Cinder Block, Inc. Detroit, Mich. The Jeffrey-Traylor vibrating feeder on the left controls the flow of cinders from the hopper to the hammer mill. Throughs from this primary crusher are carried over the belt conveyor to a Jeffrey-Traylor vibrating screen and recrushing is done through a double-roll crusher

ed concrete, including great strength, low absorption and density, without a trace of separation of the coarse aggregate from the fine particles. Concrete is to be placed in the mold box by a combination of vibration and jolting.

Proper curing is, of course, the answer to volume control and is essential to the delivery of concrete products of high quality to the job. In recent years, there has been a lot of study on the subject of curing, mainly in attempts to develop some means to expedite the curing process so that units may be delivered on the job with safety as quickly as possible after they are manufactured.

High Pressure Steam Curing

High pressure steam curing is one solution to the problem of quick curing. Six sand-lime brick plants are now curing cinder block in high pressure steam curing cylinders. Three of these plants began the manufacture of cinder block in 1937. Curing equipment of this type is costly for the average concrete products manufacturer but the principle has proven sound.

Curing cylinders used in these plants average 6½ ft. in diameter, and run from 60 ft. to 120 ft. in length. Dependent on the type of curing racks used, capacities of the kilns range from 17 to 28 standard cinder block per lineal foot of kiln length.

Usually, the units are first air dried for about five hours and then subjected to a curing cycle of 12 hours. The cycle consists of a two-hour period to raise the pressure to 120 p.s.i at 350 deg. F., eight hours at this pressure and temperature, and a gradual pressure reduction requiring two hours. When removed from



Manufacturing 43 ton reinforced concrete pipe for the Metropolitan Water District of Southern California. Concrete with a 4- to 5-in. slump was settled by vibrators, which were raised during the filling of the forms. Operators here are shown working the concrete around the reinforcement with pneumatic drills. These drills, made of ½-in. square steel rods, are 14 ft. in length and have an off-set at the lower end to function as a propeller

the kiln, the units are ready for immediate shipment. The cost of high pressure steam curing averages about one cent per block.

Electric Curing for Early Strength

The "electro-cure" method of curing concrete block, which has been described in *Rock Products* (April, 1937, and October, 1937) is now in daily operation at the plant of Standard Building Products Co., Detroit, Mich. The principle

of electric heating of concrete is based on the fact that freshly-made concrete is a conductor of low voltage electric current. The wet concrete is heated as a resisting medium and this heating speeds up the hardening process in its early stages. Tests of units picked at random from the kilns have shown unusual uniformity in strength. After five hours curing by the "electro-cure" process, compressive strengths were increased considerably over those of corresponding units air cured, whether the breaking time be when the units are a few hours old or when broken at 28 days.

After six hours curing, the blocks are readily handled. Costs of curing by electricity are about \$3 per thousand 8- x 8- x 16-in. block, based on a 2c kilowatt-hour rate. Blocks so cured have shown uniform curing throughout their cross section and attain a very high percentage of maximum strength in 24 hours.

Vacuum Process to Remove Excess Water

Another recent development, successfully applied to concrete slabs and mass concrete, is the vacuum concrete process of extracting excess water from concrete, developed by K. P. Billner of New York City. This process, which treats the problem of water-cement ratio from a new point of view, removes excess water from concrete after placing, while allowing the use of an excess of water to properly place concrete in the forms.

Vacuum pads are placed on the forms prior to the placing of the concrete, and the mats are connected to a vacuum pump which draws off the excess water. The application of the process to concrete vaults was demonstrated quite effectively at the recent convention of the Ohio State Concrete Burial Vault Manufacturers Association in Columbus. Vacuum treatment was applied for 10 minutes to a concrete slab made from concrete with an 8- to 10-in. slump. When one form was stripped off, a 200-lb. man walked on the concrete without leaving any marks, illustrating the compactness of the mix after water had been withdrawn.

High Early Strength Cements

High early strength cements are being used more extensively. More cement companies are manufacturing these cements than there were a few years ago, and they are being intensively sold. Large operators to whom early handling and rapid turnover are important, in a number of instances are making all units with high early strength cements. Others find it advantageous to attain early strengths for some units during peak operating periods or during the cold seasons of the year.



Concrete house built by A. P. Nelson, Spencer Cement Block Works, Spencer, Iowa, featuring precast concrete joists, exposed concrete block interior and concrete brick exterior

By the proper use of these special cements, repetitive casting operations can be speeded up, the pallets can be made ready for re-use earlier and it is possible to handle concrete units earlier without damage to edges, etc. A number of operators are finding it advantageous to increase the number of concrete units per bag of cement when using high early strength cement, to help offset the increased cost of the premium cement. Experience has shown that this practice can be considered only after a study of the aggregates has been made and with carefully designed and controlled mixes, followed by proper curing.

The main advantage is in the case of plants where storage capacity is limited. A rapid turnover is desirable and the early removal of products from the kilns enables an increase in the rate of production. The manufacturing capacity is often limited by the kiln curing capacity. If the degree of curing attained in 24 hr. by the use of standard portland cement can be had in 12 or even 8 hours with high early strength cement, it is obvious that production capacity can be correspondingly increased without a larger investment, assuming that the machinery has the added capacity.

New products in concrete are constantly being created. Some of these units originate in the need for such products; some are entirely new and open new markets for concrete products,



Concrete tile are used throughout in the construction of the roof of the new factory addition of the Lincoln Electric Co., Cleveland, Ohio. The units are sealed with asphaltic materials and covered with bonded waterproof roofing

and others are specials that make the manufacturer's stock complete and give his customer 100 percent service.

The precast concrete joist is now an important part of the production of concerns that are selling products for residential construction. Besides being profitable in themselves, the concrete joist is one of the best "salesmen" a concrete products manufacturer has in selling concrete masonry homes.

The standard concrete joist is the I-beam type with stirrups projecting upward to tie in with a poured concrete

slab. Several products concerns have designed concrete joist and filler block floor systems that are being sold extensively. The "Floroform System" developed by the Bedford Hills Concrete Products Co., Bedford Hills, N. Y., is a combination of concrete joists and lightweight concrete filler block that make up a fireproof floor which can be placed at low cost without the use of forms. The filler blocks are 3 in. thick or less, and are rectangular so that they can be turned and used for two spacings of joists. The bearing surfaces are the



Residences built with insulating units, consisting of a stone veneer cast integrally with lightweight concrete. The combination unit gives to the home owner who favors a stone house the advantages of concrete construction

lower flanges of the joists. In placing this floor system, a mortar consisting of 1 part cement to 3 parts of sand, or less, is poured in the joists between the blocks, and in the joints between the blocks and the joists to approximately the level of the tops of the filler blocks. After grouting, a concrete not leaner than 1:2:3½ is poured to a level about 1 in. above the top of the joists. Any type of flooring desired can then be laid.

Concrete Shingles and Roofing Slabs

Another example of a specialized floor is the "Railoc" precast concrete floor developed by the Railoc Co., Osakis, Minn., consisting of joists and floor tile. When used in combination, a completely inclosed floor is formed, ready for the top slab and plaster below without any lathing. For extremely heavy loads, reinforcing bars are placed and stirrups are extended up into the top slab to weld the entire floor slab, joists and tile into one unit. Any type of flooring can be placed by fastening to wood screeds set in the concrete grout between the joists and floor tile.

On the Pacific coast, Basalt Rock Co., Inc., Napa, Calif., is completing a new concrete products plant for the mass

the plant by a 24-in. Link-Belt conveyor and is placed into storage over a shuttle conveyor. Cantilevered out from the concrete bunker in three directions are 50-ft. steel trusses giving unobstructed production floors. The bottom chords of all trusses are flush with the bottom of the bunker so that monorail batchers may be carried to any part of the plant.

This construction is also designed to accommodate electric hoists to be installed in the future for handling larger precast wall sections than are now being manufactured. The company believes that these units will be an important development of the future. The steel truss section is roofed with precast hollow "Basalite" reinforced concrete slabs 6 ft. 6 in. long and 2 in. thick, resting on steel purlins.

These slabs are of a European design with a multi-circular core in the long axis of the slab, leaving a series of small beams between the cores. The slabs have tongue and groove edges. Reinforcing projects out of the end of the slab and is welded to the steel purlin. This is one of the products that will be manufactured in different sizes. The batch house covering of the bunker is sheathed with new type concrete corrugated shingles

9/16-in. thick and 18 in. in length.

At right angles from one end of the plant is the 30- x 200-ft. shingle and slab curing building. The shingle machine is manufactured by Powell and Hill, Ltd., Croyden, England, for the mass production of concrete shingles from $\frac{1}{2}$ in. to $\frac{7}{8}$ in. in thickness, 6½-in. wide and 12½-in. long. The shingles have two nibs projecting to hook over nailing strips and two nail holes. They are manufactured in a variety of colors. The machine has a capacity of 6000 to 7000 shingles per hour, which leave the machine on steel pallets over a wire rope conveyor. The conveyor travels 200 ft., and has curing racks on both sides. Pallets, each with two shingles, are taken from the conveyor and placed into steel racks. Curing is done at 140 deg. F. in a fully saturated atmosphere.

The next day the first racks are palletized and the shingles are dipped for color. The pallets automatically return to the machine on the lower rope of the conveyor, go through an atomizing oil chamber and back into the machine.

Stone Veneer Concrete Units

Insulated natural stone, a unit consisting of a stone facing cast integral with lightweight concrete, has made headway in 1937. A number of residences and other buildings were completed in 1937. This unit has been placed on the market so that the home-builder who favors a high grade stone veneer home can have it available at lower cost and backed up by lightweight concrete having high insulation value and other desirable properties. These units are available in various wall thicknesses, cored and without air space. The manufacture and other features of this product at Hammond, Ind., were discussed in full in the January issue of *ROCK PRODUCTS*. Frank Navratil, 931 Wilcox St., Hammond, Ind., is the licensor.



Combination concrete joist and filler block system sold extensively in the east by the Bedford Hills Concrete Products Co., Bedford Hills, N.Y., under the trade name "Floroform"

production of concrete shingles, and for the manufacture of concrete slabs of European pattern, joists and concrete masonry. The plant has a number of features that are interesting for a concrete products plant.

The plant itself is designed to be a practical demonstration of precast concrete slabs on steel. It is designed around a concrete bunker 16 ft. wide and 70 ft. long which holds ten sizes of materials. All concrete mixers are open top mixers set flush with the floor of the operating platform, which is 13 ft. 6 in. above the ground. A Fairbanks-Morse dial scale, weigh-hopper of 5000-lb. capacity will travel the length of the bunker to pick up and weigh material from any bin and discharge into any mixer. Mixed concrete discharges by gravity from bottom opening gates in the mixer.

Aggregate is elevated to the top of



New concrete products plant of Basalt Rock Co., Inc., Napa, Calif., designed around a bunker 16 ft. wide and 70 ft. long, holding ten sizes of material. Pre-cast hollow Basalite reinforced concrete slabs of a European pattern and concrete shingles are among the products to be manufactured.

Many Colors and Various Sizes Promote Sales

CONCRETE BRICK GOES MODERN

THE YEAR 1937 has recorded the manufacture of millions of concrete brick using thousands of cubic yards of surplus or waste aggregate and large quantities of portland cement. This brick has been used in construction of almost every type of building in all parts of the country and in Canada and Mexico.

Only a few years ago, the use of concrete brick as a standard building material was practically unknown. Today, however, it is being accepted and used extensively in both U. S. government and State projects. Architects in increasing numbers are specifying it for a veneer as well as for a back-up material. Among its users in industrial construction are included the names of DuPont, General Motors, Chain Belt, Champion Spark Plug, and many others. Its new and variegated colors, obtainable in concrete face brick, account for its being selected for gasoline stations, stores and fine residences where attractiveness is the outstanding consideration.

Concrete brick usually comprises from 80 to 90 percent aggregate, and in many cases this consists of surplus or partially

waste material. This aggregate (sand and gravel or crushed stone) is of course available in almost every community.

Compare this with processes of making other brick, which account in part for their high cost. The clay brick plant must be located where satisfactory clay deposits are available. This means higher selling price to cover the increased cost of transportation. These freight charges often amount to more than the entire cost of making concrete brick. In addition to this, there is the high price of coal to which must be added transportation costs. Centrally located plants must depend upon dealer distribution, which again adds heavily to the selling price.

A number of progressive sand and gravel and crushed stone producers have installed a straight line production machine in recent years to produce concrete brick of high quality and at low unit cost. The strength of the brick produced has been demonstrated by numerous tests taken from stock brick of widely separated operating plants, many of which show a crushing strength of well over 3500 p.s.i. and an

absorption as low as 5 percent. With concrete brick, the natural affinity of mortar also tends to produce a stronger wall or structure.

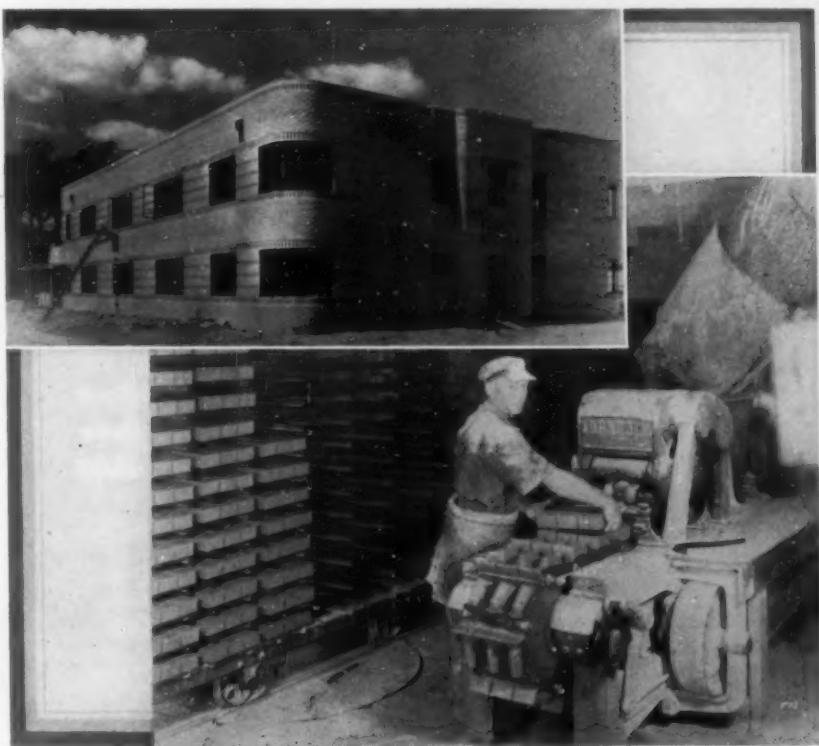
Weight has been given consideration due to the improved design of concrete brick, providing a void or recess which reduces the weight up to 20 percent.

The more modern concrete brick machines, by simple adjustments, have provisions for making multiple sizes of standard brick—a unit in 2-brick size and a unit in 3-brick size, as well as up to a unit consisting of nine brick plus a half inch mortar joint. This feature enables the manufacturer to supply architects and contractors a lower cost masonry material with a number of possibilities for improved structural design, either in combination with standard brick or in combinations of larger sizes. In some localities these new sizes are being used in all-masonry, hollow, insulated construction that is reducing the cost of permanent, fire-safe masonry construction to the level of good frame.

Probably the biggest single feature in advancing the popularity of concrete brick, outside of cost reduction, has been the development of processes of manufacturing brick and multiple sizes in a full range of colors. This makes it possible for one brick manufacturer to serve the entire market, whether it consists of face brick, common brick or multiple sizes for back-up material. This process has contributed greatly to expanding the popularity of concrete masonry, in offering a wide choice of colors, shades and textures.

Colored Brick Increase Market

This process consists of pneumatically spraying a specially prepared glazing material on the brick, which has been mixed to a plastic mass about the consistency of mortar. With this process it is possible to produce an almost endless variety of colors, shades and textures. This glazing material is waterproofed, enabling common brick to be converted into face brick ready for delivery in a few days. Thus the purchaser selects from the manufacturer samples of brick he wants or specifies. Then the manufacturer can quickly supply this desired color at small additional cost over common brick. This particular process has greatly accelerated the acceptance of concrete brick by the building trades in carrying out today's vogue of modern architectural design and color harmony.



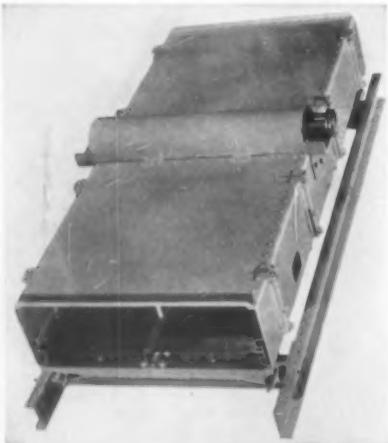
Above: Large modernistic structure built with concrete brick. Below: Interior of the Georgia Mineral Co.'s Concrete Brick plant

New

MACHINERY & EQUIPMENT

Dust-Tight Screens

UNIVERSAL VIBRATING SCREEN CO., Racine, Wis., will feature dust-tight, top and bottom enclosures in the new screens recently placed on the market.



Improved vibrating screen has dust-tight, top and bottom enclosures. Top panels are hinged

Hinged top panels are opened easily and quickly, according to the manufacturer, and the enclosures are so constructed that the screen operates as quietly as the standard open types made by the same firm. In the illustration is shown one of the new types of vibrating screens.

New Type, Two-Cycle Diesel Engines

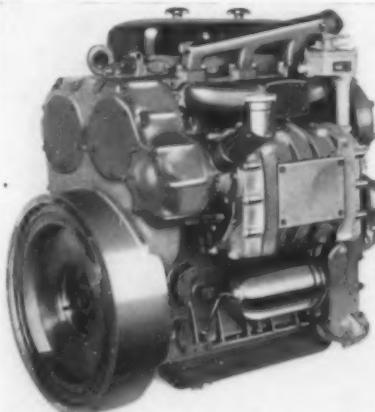
GENERAL MOTORS CORP., Detroit, Mich., has announced the development of a new two-cycle Diesel engine, having much the same construction and appearance as the conventional four-cycle gasoline and Diesel engines. In addition to the marine, truck, and motor bus applications of this type of engine, it also is said to be suitable for operation of small electric power plants, pumps, air compressors, tractors, and cranes.

There are three models in the 71 series: Model 3 having three cylinders, bore and stroke $4\frac{1}{4}$ -in. x 5-in., and maximum horsepower of 80 at 1800 r.p.m.; Model 4 with four cylinders, same bore and stroke, and 107 hp.; and Model 6 with six cylinders, same bore and stroke, and 160 hp.

Cylinders are cast in block with removable dry liners, the cylinder head being a one-piece removable unit with

overhead valves. The valves are operated through rocker arms and push rods from a camshaft located in the upper part of the cylinder block. The camshaft is driven by a train of gears which also drives the blower. Water pump, fuel transfer pump and governor are mounted on the blower and driven by it.

In order to function as a two-cycle uniflow engine, the cylinders are made with inlet ports, through the liner and water jackets at the bottom stroke position, which connect the cylinder to the



New two-cycle Diesel engines with interchangeable parts. A feature of this engine is the method of eliminating vibration

air box surrounding the cylinder proper when the ports are uncovered by the piston. The blower is flange-mounted on the side of the cylinder block and discharges directly into the air box.

Fuel is sprayed into the cylinder by a combined pump and spray nozzle or unit injector located between the valves in the cylinder head and operated from the camshaft by a rocker arm, like the exhaust valves.

A provision for completely balancing the engine is perhaps the only really new design feature. With the camshaft arranged to give uniform firing of all the cylinders each revolution, thereby obtaining the smoothness equal to four-cycle engines of double the number of cylinders, there results a small fore and aft rocking couple. This has been completely balanced out by small counterweights at each end of the camshaft, and a second similar shaft on the other side of the cylinder block. By this balancing arrangement, it is possible to produce engines of 1, 2, 3, 4, 5, 6 or

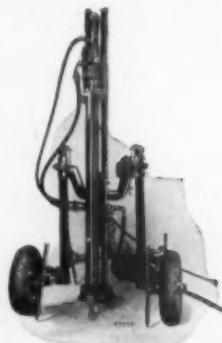
more cylinders that are free from unbalanced forces or couples.

Interchangeability of practically all parts of the different models in the series is possible as the front ends of the cylinder blocks of these engines are exactly like the rear end. In a similar manner the cylinder head, blower, bearings, etc., are all alike on each end. The only difference between the three and the six is that three more cylinders have been added in the middle of the engine, and the crankshaft, camshaft, blower, etc., lengthened accordingly. Other parts are also identical. Another interesting feature is that the entire cylinder block and blower assembly can be turned end for end without disturbing the flywheel or gear train, and thus place all the accessories on the opposite side.

Wagon Drill With Ratchet For Operation of Drill Guide

INGERSOLL-RAND CO., New York City, has announced the production of a new FM-2 wagon drill.

A distinctive feature of this light-weight drill, according to the manufacturer, is a ratchet, by means of which one man can quickly raise or lower the drill guide on the uprights. This drill has the same automatic, positive feed at any angle, which proved so successful on the previous model. This air-motor, controlled-pressure feed provides an infinite range of feed pressures from 1 to 1000 lb. A worm gear, which transmits power from the air motor to the



Drill with ratchet for operation of drill guide makes it easy for one man to operate the mechanism

feed chain, is self-locking, eliminating all thrust and shock to the motor, and preventing the drill from dropping or jumping forward.

The new FM-2 wagon drill uses the

same fast and powerful drills as the larger wagon drills, and will accommodate a 6-ft. steel change. Twenty-foot steels are easily handled. It is built for continuous, heavy-duty operation, yet it is light and has the versatility of a jackhamer.

Rubber Track Increases Crawler Efficiency

B. F. GOODRICH CO., Akron, Ohio, has developed a rubber endless track for crawler tractors which is said to make possible the handling of greater loads of rock, earth and other materials with no increase in fuel or power consumption. Ability to travel with equal ease over soft earth or concrete highways is another advantage claimed for crawler tractors equipped with the new rubber track. The increased tractive power of rubber on all types of surface is the main factor in the increased pulling power, it is said, while the fact that the tread is composed entirely of rubber enables tractors so equipped to use concrete and macadam roads where steel tracks are prohibited.

Exhaustive tests of tractors equipped with the new rubber track are said to have proven its unusual possibilities, with an average speed of 39.6 miles per hour being maintained for a continuous run of 1000 miles. Because of the elimination of joints made possible by the new rubber belt, tractors fitted with the new track show power and fuel savings ranging from 20 to 60 percent, depending upon the speed of operation, according to the manufacturer.

Known as the Goodrich rubber track, the design is said to represent a com-

plete departure from any existing crawler track, and it is claimed will not stretch and change its pitch during its entire life. The new track, it is explained, consists of an endless rubber belt reinforced longitudinally with a number of steel cables. In addition to the cables, steel driving members are vulcanized into the rubber and made an integral part of the unit. This design is distinctive in that greater tensile strength for the same width of track can be built into it, than is possible for all other types of steel tracks.

Improvements In Excavators

THE MARION STEAM SHOVEL CO., Marion, Ohio, has introduced its new 1938 line of excavators which are said to combine an abundance of speed for high yardage with precision control over every machine movement.

Excavators in the 1½, 1½, 1¾, 2 and 2½ cu. yd. class are included in the new line. The new and major features are: self-cleaning, non-binding crawlers of exceptional length and width; large diameter supporting axles, "live" roller circles between upper and lower frames for even load distribution, anti-friction bearings at all major points, large diameter rotating clutches, and independent chain crowd.

Maximum operating speed is secured with a proper balance of machinery units, conveniently arranged operating levers, clear vision of operator and by easily actuated large diameter clutches. Propelling gears are sealed against dirt and operate in oil, and the chain drive reduces wear on propelling sprockets.



Recent development in excavators has the following features: non-binding crawlers of exceptional length and width; large diameter supporting axles; anti-friction bearings at all major points

Safe Air Supply For Workers

The W. W. Sly Manufacturing Co., Cleveland, Ohio, has developed new safety equipment designed to supply outside, filtered air to the helmet of workmen engaged in rock drilling, blast cleaning and other operations.

This equipment, which is known as the Purair Blower, consists of an air intake filter, a blower of the impeller type, a V-belt drive, and a ¾-hp. 110-220-volt a.c. single phase motor. Other equipment includes a relief valve, adjustable for air volume, an air filter and pressure equalizer, and an air out-



Safety equipment designed to supply outside, filtered air to the helmets of workmen

let pipe with a hose coupling. The new unit is connected up with the air helmet in use or with a Purair helmet. Taking relatively pure air from the outside, practically all possibility of dust hazard is eliminated with this equipment.

Crawler Hoist Handles Many Jobs

THE HARNISCHFEGER CORP., Milwaukee, Wis., presents to the construction and maintenance field the P&H multi-service crawler hoist. Provided with three hoisting drums, the new crawler hoist combines in one machine high lifting capacity with the drawbar pull and mobility of a tractor from which it is possible to work off either side or over the front end. With three forward travel speeds ranging from 1.3 m.p.h. in low gear to 5.2 m.p.h. in high, this machine gives tractor mobility to meet all ground conditions whether the job calls for climbing steep hills or traveling through soft, swampy areas. It has a ground pressure of only 7.6 lb. per square inch. Its live boom is quickly adjusted up and down, enabling the crawler hoist to adapt itself to a wide variety of work.

Some of the jobs which the multi-service crawler hoist can handle easily are: pushing as a snow plow bulldozer or with angle blade, lifting as a crawler crane or clamshell, pulling rotary scrapers, dump wagons, road graders,



Multi-service crawler handles a variety of jobs etc., for highway construction work, pipe handling, back filling trenches and general utility lifting and moving work, earth boring through a boring head that will dig holes at any angle up to 45 degrees in any direction.

With its novel drum hoist arrangement, it is also valuable for switching freight cars, for handling dry material for underwater digging with flat line cableways, or as a power drag scraper in open-pit quarries.

Improved Type of Electrode Holder

THE LINCOLN ELECTRIC CO., Cleveland, Ohio, has announced a new arc welding electrode holder which is said to be remarkably light in weight for the capacity. The new holder, designated "Type ST", weighs 14 ounces and has a current capacity of 250 amp. continuous, equaling that of many type holders weighing 25 ounces or over. The light weight is attributed to the use of formed steel parts, electrically welded. An extremely



Light-weight electrode holder designed for 250 ampere capacity

simple type of connection assures positive contact and eliminates loose connections, a more or less common cause of overheating in holders. To assure permanence of connections, all contacts are electrically welded.

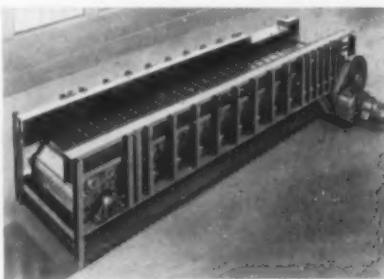
Other important features of the new holder, in addition to light weight and easy connectibility, are: reduced over-

all width; rounded rather than square corners; use of heavier copper jaws to assure maximum conductivity and prevent sticking of the electrode to the holder; grooving of the jaws for vertical and overhead as well as flat welding; a hollow fibre handle, and fully insulated thumb lever and non-groundable sturdy spring. The "Type ST" holder will accommodate any size electrode up to and including $\frac{1}{4}$ -in.

Apron Feeder of New Design

LINK-TRACK ENGINEERING CO., Chicago, Ill., has introduced the Rorabeck Apron Feeder which is designed primarily for feeding ore, stone and coal to crushers, pulverizers, screens and process equipment.

In the design of the new apron feeder, generous use of heavy channel irons and "I" beams insures alignment at all times and gives ample support



Apron feeder designed primarily for feeding ore, stone and coal to crushers, pulverizers, and screens

to the conveying apron. A combination of welding and bolting provides a rigid structure capable of withstanding the impact of materials dropped from considerable height or with great force, without distortion and stretching of the apron. The apron flights are of manganese steel and have reinforcing ribs running their full length. Connecting links are cast integral with flights and are so constructed the fines cannot sift through between flights.

The apron rides on rollers which run on rails. Rollers engage with the driving and idling sprocket wheels. A center set of rollers beneath the flights at each end maintain proper apron tension and prevent flights from bending under load at the turns. S. K. F. Ball Bearings are used on the driving and idling shafts, being enclosed in a dust proof housing with hardened metal seal rings. The new apron feeder is reversible, and feeds with equal facility and no vibration traveling in either direction.

DEWEY PORTLAND CEMENT CO., Kansas City, Mo., paid a year-end bonus to employees on January 10, 1938.

New Portable Concrete Pipe Plant

THE CONCRETE PIPE MACHINERY CO., Sioux City, Iowa, manufacturers of the dual packer head machine, announces the development of a portable unit. It is one of their standard machines mounted on a low trailer, the front end of which is elevated to pass over the chassis of a truck and attach to a horizontal fifth wheel. A 25 cu. ft. mixer is mounted on the elevated front end in proper relation to the machine, and the unit does not have to be removed from the trailer to place it in operation. A skip loader is attached to the mixer after the truck is removed, permitting the mixer to be charged at ground level.

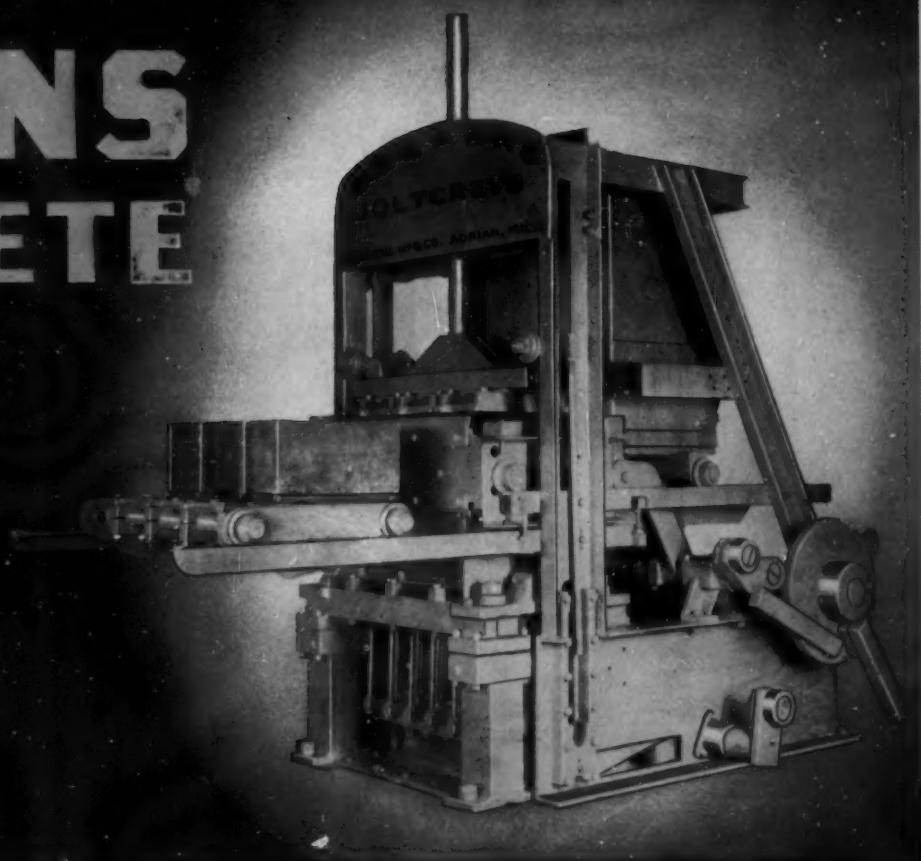
A site on high ground with good drainage should be selected to facilitate the trucking in of raw materials and the yarding and delivering of the finished product. The only improvements required are a small cement shed and a 75- x 75-ft. concrete floor on which the pipe are stripped as they are taken away from the machine. No plant building is necessary. Temporary jobs may be handled between May 1st and November 30th in the northern states. Tarpaulins stretched over a 20-ft. by 20-ft. framework, made of iron pipe with casters under the legs, protect the pipe from sun and wind for six hours during which they are sprayed at intervals. After they are six hours old, they can be sprayed almost continuously until nightfall after which intervals through the night is sufficient. Three of such tarpaulin frames cover an area 60-ft. by 20-ft., sufficient for six-hour runs, after which they can be moved as more space is needed.

Through the use of the new roller head, the economy of the packer head system has been extended to 36-in. pipe. Coupled with a few hand cast molds in sizes above 36-in., the manufacturer completes his line from 4 in. up, to handle any temporary job.

The Sealite Joint, which is sealed and locked with either cementitious or bituminous compounds, eliminates infiltration which overburdens the disposal plant and causes cesspool contamination along the ditch line. The dual packer head machine makes it possible to obtain this joint on bell and spigot pipe.

OCEOLA STONE CO., INC., Holmes-Liberty, Ohio, has been organized by a group of former employees of the National Lime & Stone Co. These incorporators are Matt Otto, Virgil Horn, Chester Reiff, Walter Gearhart and H. E. George. They propose to build a crushing plant to make crushed stone and agricultural limestone and have it in operation by March 15.

STEARNS JOLTCRETE



A machine that is revolutionizing an Industry!

BETTER BUILDING UNITS

STEARNS JOLTCRETE building units command higher prices because they're better than ordinary units. This machine permits use of a more desirable water-cement ratio and fineness modulus. Every aggregate particle thoroughly coated with cement. Light aggregates are not fractured. The units are of maximum density, therefore have minimum absorption. They have greater acoustical value—greater insulation value. They're clean cut, uniform in texture, perfect in appearance.

—MADE FASTER

Three 8x8x16" blocks at an operation—two to three operations a minute—6 to 9 blocks per minute, with two men! Or 20 bricks per operation—40 to 60 a minute. Or any number of units of any size or shape that will fit a mold box 12x18x24".

—AT LOWER COST

More units per bag of cement because concrete of lower water-cement ratio is employed; because coarser material may be used; and because of the super mixing action that takes place during the molding. Labor cost per unit is less. In spite of Jolcrete's lower first cost no other machine can match its capacity. Maintenance cost is lower. It is an interesting fact that Stearns Jolcrete units cure more rapidly.

7200
packing blows
per minute!

A RADICALLY NEW MANUFACTURING PROCESS

How are all these startling advantages secured? By a revolutionary process of packing the concrete in the mold.

The off-bearer presses a button, the machine feeds itself, vibrates the concrete to required density, finishes the top, strips the block up—all automatically. The off-bearer has only to drop the pallets in—press the button that starts the operating cycle—take away the blocks made in the previous cycle.

And the vibration—7200 blows a minute—is of limited amplitude. The mold travels only $3/64$ of an inch each trip. That's the feature involved in the broad patents on the machine. It's the heart of the process—the factor that makes possible all the results mentioned at the left.

WRITE FOR COMPLETE DETAILS

The story of Limited Amplitude Vibration and its application in the STEARNS JOLTCRETE Machine—the details of the amazing performance of the equipment—are of definite importance to every present and prospective concrete products manufacturer and every aggregate producer. Write for illustrated folder.

STEARNS STRIPPERS

Stearns equipment for the production of concrete units by the conventional tamper and stripper method is unexcelled for variety and quality of output, speed of operation and low upkeep. Stearns Power Stripper uses eight-bar, alternate tamping.

THE NEW CLIPPER

Stearns Clipper Stripper—a new model in the Stearns line—is designed for smaller plants. It provides for eight-bar alternate power tamping and for various combinations of feed, strike-off and strip operations, either by hand or power. Ask for circular.

STEARNS
MANUFACTURING CO. - ADRIAN, MICH.
GENE OLSEN, PRESIDENT

Block Manufacturing Improvements

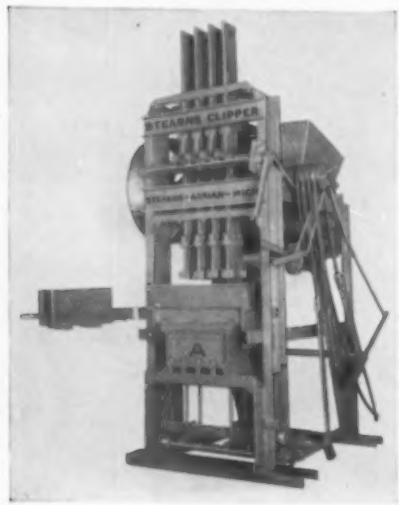
STEARNS MANUFACTURING CO., Adrian, Mich., is introducing the "Jolcrete" machine after completion of a year's performance in actual operation. This machine, which operates on the principle of "limited amplitude" vibration, is claimed to manufacture units having very uniform texture. It is further claimed that when units are made with



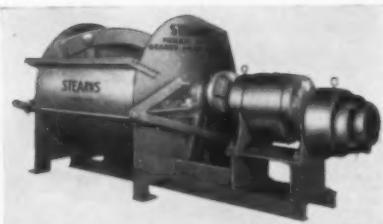
Machine developed to manufacture even textured concrete units by vibration

lightweight aggregates there is no breakage of particles and that the units possess high insulation and acoustical value.

The concrete is given 7200 vibrations per minute with a mold box travel of $3/64$ in. in a vertical plane. The machine requires no operator, since the operation of each cycle is entirely automatic. In the vibrating process, it is said that aggregate particles rub against each other



Stripper block machine which may readily be converted to automatic operation



Concrete mixer driven by geared-head motor

to give a re-mixing action that coats each particle with a thin film of cement and that each particle finds its "best fitting" position in the mass.

Stearns also announces the Geared-Head Motor Drive Mixer, which is said to incorporate a new method of applying power to a concrete mixer. The geared head motor is direct-connected to the paddle shaft, which is mounted in ball bearings, and eliminates exposed gears, jackshafts, clutches and pulleys.

The Stearns Clipper Stripper, a completely self-contained, block-making unit is also announced. This machine is available in several models and has a power tamper of the eight bar alternate drop type. Power attachments are available for all operations or can be installed, whenever desired, to eliminate all hand operations without discarding any of the original equipment. For use on power strippers, Stearns has a new pressure head attachment for making smooth-topped units.

HEIDIG CONCRETE BLOCK CO., Gordonville, Penn., owned by Andrew J. Heidig, Lancaster, Penn., suffered a loss of \$5000 from a fire.

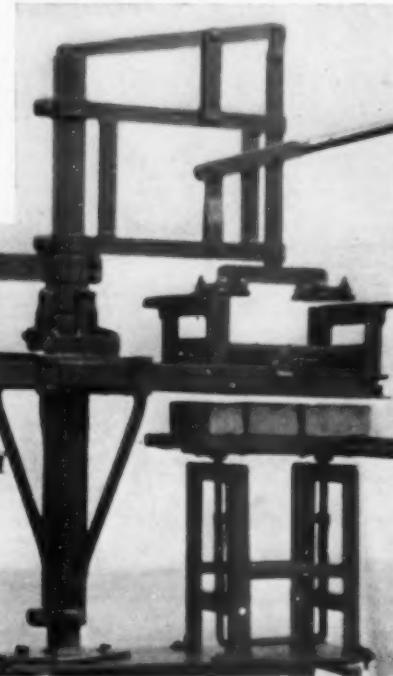
Lightweight Concrete Tile and Block Machine

STEPHEN FLAM, Sherman Oaks, Calif., has developed a lightweight machine for the manufacture of concrete tile, brick, and block sizes which has a number of interesting features. It is adaptable for both permanent and portable installations, it is simple in construction, and has been designed to reduce weight to a minimum consistent with strength.

The vibrating table, shown to the left in the illustration, comprises two wooden cantilever arms on which the mold rests. An eccentric cam transmits the vibrations to a concrete-filled mold by means of a belt drive from a small electric motor or other source of power, if electricity is not available. After the filled-mold has been sufficiently vibrated, the pivoting mold support arm is swung clear from the vibrating table, and the filled-mold is turned over, without a pallet, by means of trunnions on the support arm. The inverted mold is then pivoted on the support arm and brought under the stripping press ready to be ejected. At the same time the mold on the other end of the pivoting support arm is turned over and pulled into position on the vibrating table. The ejection press and vibrating units are combined in one.

All-steel adjustable molds produce units from 2 in. to 8 in. high, and special designs may be furnished, if desired. One size pallet serves for all size tile and brick.

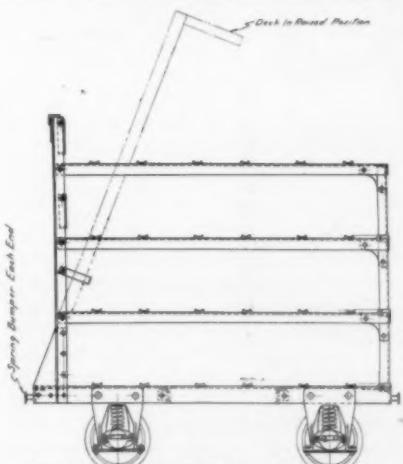
Production in an 8-hr. shift is reported to be 2500 standard 8-in. tile; 3200 standard 6-in. tile; 4500 standard 4-in. tile; or 8000 standard brick.



Light-weight machine for the manufacture of concrete tile, brick and block sizes which combines vibrator and stripper press

Improved Curing Racks for Concrete Products

THE CHASE FOUNDRY AND MANUFACTURING CO., Columbus, Ohio, has announced new hinged deck cars and lift



Hinged deck cars and lift trucks for handling concrete block

trucks for handling concrete blocks while curing. By hinging the decks, each car or rack becomes one complete unit without any loose parts to spring out of shape. It is claimed that the design is such that the pallets are al-

ways properly supported, and that the decks are positively locked when in the raised position. The design permits loading from one side or both so that the operator can always have an empty rack while another is being taken away. The cars have a spring bumper at each end.

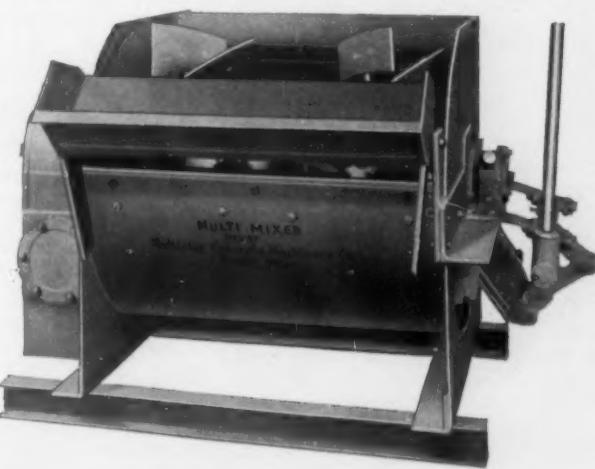
New Type of Batch Mixer

MULTIPLEX CONCRETE MACHINERY CO., Elmore, Ohio, has placed on the market a new type of batch mixer which

is claimed to give thorough mixing in unusually short time and at a low power cost. The construction of the main shell comprises an all-steel welded frame with added steel liners in three sections, which are replaceable. The discharge is from the end instead of from the center, bottom, or side, and is designed to give a positive fit when closed.

Other advantages claimed for this new structural feature are more perfect and free mixing, the elimination of friction while mixing, water tightness and

Batch mixer with all-steel welded frame. Discharge at the end



BUYERS' SERVICE FREE

RESEARCH SERVICE DEPARTMENT, Rock Products, 205 W. Wacker Drive, Chicago, Ill.

We are in the market for and would like to receive prices and literature on the items checked below:

Accelerators.	Cement, Waterproof.	Mixers, Delivery.	Screening Equipment.
Admixtures.	Portland.	Mixers, Mortar and	Screens, Vibrating.
Agencies, Machinery.	Cement, White	Plaster.	Septic Tank Molds.
Aggregates, Special.	Portland.	Mixer, Ready-Mix	Sidewalk and Curb
Air Tools.	Chains, Plates and	Concrete Bodies.	Forms.
Anti-Freeze Com-	Monorail Systems.	Monoilithic Silo Forms.	Silo Doors, Hardware
pounds.	Chimney Block Ma-	Motors, Electric.	and Scaffolds.
Architectural Trim-	chines and Molds.	Motor Truck Dump	Silo Forms, Monolithic.
stone.	Clamps and Ties.	Bodies.	Silo Roofs.
Bags.	Clutches, Friction	Motor Trucks.	Silo Stave Machines
Batchers, Weighing.	Compressors, Air.	Name Plates.	and Molds.
Benders and Cutters.	Concrete Chutes and	Name Stamps.	Smokestacks.
Bar and Angle.	Placers.	Ornamental Molds.	Spraying Equipment.
Bins, Gates and	Concrete Coatings and	Oscillating Attach-	Sprinkling Systems.
Hoppers.	Paints.	ment Accessories.	Stampings, Metal.
Block, Chimney—	Concrete Conduit	Pallet Facing	Stamps, Name.
Molds and Machines	Machines.	Machines.	Stone Backing.
Block Machines,	Concrete Hardeners.	Pallets, Steel or Wood.	Storage Bins.
Building.	Concrete, Nailing.	Perforated Metals.	Strippers.
Block Machines,	Conveying Machinery.	Pipe Machines, Sewer.	Stuccos.
Catch Basins.	Conveyor, Idlers and	Pipe Machines,	Stucco Machines.
Block Machines—	Roller.	Culverts.	Sun Dials.
Cement, Gutter.	Conveyors, Gravity.	Pipe Molds.	Surfacing Machinery.
Block Machines, Silo.	Coc Crib Block and	Prismatic Tools.	Tamps, Automatic.
Block Molds, Building.	Tile Machines.	Posts, Fence Molds	Tamps, Elevated and
Bolt Cutters.	Cranes, Crawler and	and Machines.	Storage.
Bonding Compounds.	Locomotive.	Posts and Standards,	Testing Equipment.
Brick Machines.	Cranes, Traveling.	Ornamental and	Thermometers.
Brick Molds.	Crushers and	Lighting.	Recording.
Buckets, Clamshell.	Pulverizers.	Processes.	Tiles, Wall.
Buckets, Concrete.	Culvert Forms and	Pumps, Diaphragm.	Tile Machines,
Building Tile	Molds.	Pumps, Pressure.	Building.
Machines.	Curing Equipment,	Reinforcement, Ex-	Tile Machines, Drain.
Bundling and Clean-	Electric and high	panded Metal.	Tile Machines,
ing Machines, Sack.	pressure.	Reinforcement Metal	Roofing.
Burial Vault	Curing Racks.	Fabric.	Tools, Finishing.
Equipment.	Drag Conveyors and	Reinforcement, Metal	Trimstone Molds.
Burial Vault Molds.	Scrapers.	Lath.	Trucks, Hand and
Car Pullers.	Drain Tile Machines.	Reinforcement,	Lift.
Car Unloaders.	Driveway.	Special.	Trucks, Power.
Cars and Track.	Elevators, Portable	Reinforcement	Vibrators.
Carts, Concrete.	Stacking.	Welding.	Wall Forms and
Cement, Aluminate.	Engines, Diesel, Gas,	Roofing Tile Machines	Machines.
Cement Colors.	Oil, Steam.	Roof, Wire.	Waterproofing and
Cement, High Early.	Engineers, Designing	Sanding Beds.	Damp-proofing.
Strength Portland.	and Consulting.	Sand Testers.	Well Curing Ma-
Cement, Masons.	Facing Materials.	Sand Washers.	chines and Molds.
	Feeders.	Saw Rigs.	Wheelbarrows.
Name.....		Scales.	
City.....			

protection against stalling due to jamming of large aggregate. The mixer is adaptable for overhead bin construction or can be applied to a track furnishing more than one machine. It is operated through a worm gear, and the machine has four bearings.

The mixer can be driven by belt drive or direct motor drive. As a safety measure and to distribute cement over the entire width of the mixer, a cement tray is standard with the new mixer. This machine will be on display at the Concrete Industries Exposition.

Erect Products Factory

KAMMERER CONCRETE PRODUCTS CO., El Paso, Ill., has purchased a three-acre tract of land located between the Lake Erie mine and East Peoria, Ill., according to Mr. M. Kammerer. For the last 20 years, the Kammerer company has been doing business in El Paso, but after the plant was destroyed by fire some time ago it was decided to rebuild where shipping facilities would be better.

The new factory will cost about \$8000. It will occupy an area 44 by 80 ft., and will have four steam curing rooms 20 by 60 ft., adjoining the main building. The company manufactures concrete drain, sewer and culvert pipes, running from 6 in. up to 60 in.

Gravel Company Constructs Concrete Mixing Plant

GRAND RAPIDS GRAVEL CO., Grand Rapids, Mich., has constructed a modern concrete mixing plant adjacent to its gravel screening plant. It is constructed with a steel framework encased in concrete and the timber sidings are covered with heavy gage sheet metal. Three steel bins are available for sand and gravel with a capacity of 150 cu. yd., and a steel cement bin with a capacity of 300 bbl. The sand and gravel is delivered to the mixing plant by a belt conveyor from the gravel washing plant, while cement, which is used in bulk form, is carried to the top of the plant by screw conveyor and a bucket elevator. Weighing batchers are installed beneath the aggregate and cement bins. The charge from the batchers is then dumped into the 4 cu. ft. Lakewood mixer and from there the concrete is spouted into transit mix trucks for delivery to the job.

The plant also houses a 750-gal. boiler, fired by an automatic oil burner, which supplies hot water and steam for use during freezing weather. Steam is used to heat the sand and gravel, and hot water is added to the mixture, resulting in

concrete which arrives on the job warm enough for satisfactory pouring in cold weather.

Concrete Mixing Plant

ANDERSON-DUNHAM CONCRETE CO., Baton Rouge, La., recently began operation of a new \$80,000 concrete mixing plant at the intersection of Chickasaw Rd. and the Louisiana and Arkansas railroad. Deliveries are made in six trucks equipped with truck mixers.

BURTON SMITH, Florida representative of the Portland Cement Association, has resigned to enter the concrete products business with Sam Johnson, Sarasota concrete products manufacturer. A new products plant has been built at Port St. Joe, in northern Florida, where concrete units will be manufactured using "Superock" blast furnace slag aggregate. It is reported that a contemplated industrial expansion at Port St. Joe will increase the city's population from 300 to 10,000 within a very short time.

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, paid a Christmas bonus to all employees of 1½ percent of the annual earnings of each.

Real Money Making Opportunity in Concrete Joists and Concrete Pipe

Here is the new easy way to develop a profitable business or increase your present income.

For nearly 30 years the R & L CONCRETE MACHINERY COMPANY has supplied the equipment for making these concrete products. Every development has been included which will improve the quality of the finished product, increase the ease and efficiency of operation and decrease operating costs.

R & L CONCRETE JOIST MACHINE

The 10-gang mold illustrated will enable you to dominate the building market in your locality for Precast Concrete Joists.



R & L CRESCENT CONCRETE PIPE FORMS

This all-steel bell-end form is constructed of prime blue-annealed steel, substantially reinforced with angle and bar steel, electric welded and riveted to assure long life and uniform pipe.

The R & L line includes forms for making all sizes of Reinforced Tongue-and-Groove Concrete Pipe.

No Experience Necessary—Small Investment

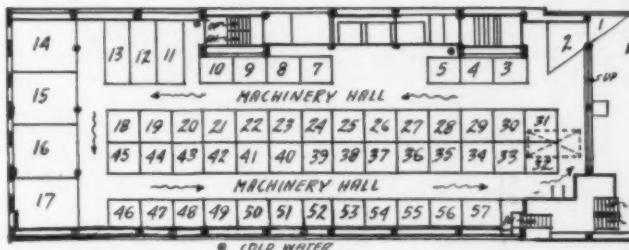
All R & L equipment is easy to operate, requiring only common labor able to follow simple instructions. Low in first cost and practically no maintenance cost.

Don't miss our complete display at the CONCRETE INDUSTRIES EXPOSITION in Chicago February 8-11 Booth...

R & L Concrete Machinery Co.
KENDALLVILLE INDIANA

Concrete Industries Exposition

Directory of the Exhibits
Equipment on Display, and
Products Manufactured



American Aggregate Co.
Kansas City, Mo.

Will have a display of concrete products made of "Haydite" lightweight aggregate.

Barrett Cravens Co.
Chicago, Ill.

Besser Manufacturing Co.
Alpena, Mich.

Will display a small Besser Plain Pallet Stripper, a small Mixer and Multi-Mold, a Hand-Operated Plain Pallet Tamping Machine and have an exhibit of block and tile of various kinds and sizes as well as giant photographs. In the area-way below the exhibition hall may be seen a large automatic machine in operation.

Blaw-Knox Co.
Pittsburgh, Penn.

Manufacturer of automatic weighing equipment, automatic aggregate batchers, batching plants, concrete buckets. Will feature "Trukmixers" and agitators.

Blystone Manufacturing Co.
Cambridge Springs, Penn.

Will display a B-2½ cu. yd. mixer, with motor attached.

Calcium Chloride Association
Detroit, Mich.

Manufacturer of calcium chloride, used for early hardening and curing of concrete as well as for stabilized road construction.

Chain Belt Co.
Milwaukee, Wis.

Will display Rex truck mixers; Rex 160 pumpcrete, Rex 3½S and 5S mixer, and contractors' small pumps.

Colorcrete Industries, Inc.
Holland, Mich.

Manufacturer of masonry paints and equipment for spraying. Will exhibit paint spraying equipment.

Commercial Shearing & Stamping Co.
Youngstown, Ohio

Will have on display a representative line of concrete block and tile pallets.

Booth 59

Booth 99

Booths 30-31-32-33

Booths 3-4-5

Booth 20

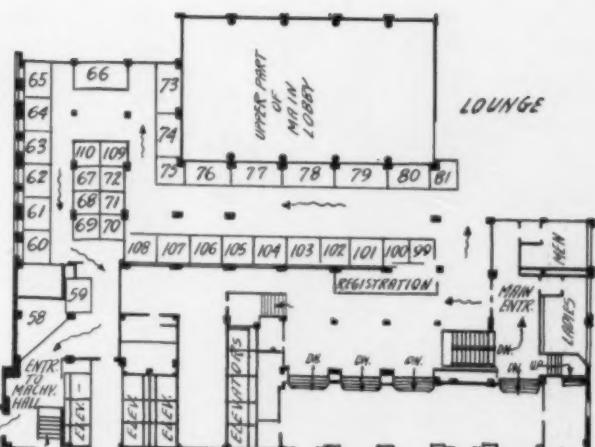
Booth 102

Booths 14-15-16-17

Booth 2

Booth 23

FEBRUARY, 1938



Construction Accessories, Inc.
Chicago, Ill.

Booth 60

Will exhibit a line of accessory equipment used in concrete construction, including various types of clamps, threaded rods, spacer ties, band ties, masonry anchors, concrete inserts, floor clips and a special display of wrapping for concrete reinforcing.

Construction Machinery Co.

Waterloo, Iowa

Booths 36-37

Will show a one-bag, two-wheel, trailer mixer; a 3½ S half-bag, tilter; a new DUAL PRIME, self-priming pump; a pneumatic-tired wheelbarrow and concrete cart.

W. E. Dunn Manufacturing Co.

Holland, Mich.

Booths 38-39

Will have in operation a brick and roofing tile machine.

Stepham Flam

Sherman Oaks, Calif.

Booth 67

Will have a special working model of his new vibrating table and tile machine.

Fuller Co.

Catasauqua, Penn.

Booth 75

Will have a picture display of the Fuller-Kinyon system for handling bulk cement.

Glaze-Crete Corp.

Pittsburgh, Penn.

Booth 21

Manufacturer of a new structural unit with a distinctive glaze facing.

Germac-Rupp Co.

McMfield, Ohio

Booth 40

Self-priming, centrifugal pumps for contractors will dominate this exhibit.

Hollow Concrete Wall Mold Co.

East Troy, Wis.

Booth 97

Will give a complete demonstration of all its molds for making monolithic hollow concrete walls and the various sections used in building construction.

Insley Manufacturing Co.

Indianapolis, Ind.

Booth 41

Manufacturer of concrete carts and buckets.

Jaeger Machine Co.

Columbus, Ohio

Booths 52-53-54-55-56-57

Will display a complete line of truck mixers, agitators, concrete, mortar mixers and small mixers for contractors and contractors' pumps.

Jeffrey Manufacturing Co.

Columbus, Ohio

Booth 100

Will have a pictorial review of conveying equipment and crushing machinery.

Koehring Company Milwaukee, Wis.	Booths 18-19-44-45	The Ransome Concrete Machinery Co. Booths 24-25 Dunellen, N. J.
Has the corner display featuring a 3½S concrete mixer, a 7S concrete mixer and a small mud jack.		Will exhibit one of its latest designed 5S mixers and a 6-cu. ft. plaster and mortar mixer. A small scale model of its truck mixer will also be exhibited.
Lancaster Iron Works, Inc. Lancaster, Penn.	Booth 69	Richmond Screw & Anchor Co. Booth 104 Brooklyn, New York
Will operate a small model of the Lancaster mixing machine.		R. & L. Concrete Machinery Co. Booths 49-50 Kendallville, Ind.
Mail Tool Co. Chicago, Ill.	Booth 22	Manufacturer of joist machinery, pipe molds and other equipment.
Medusa Products Co. Cleveland, Ohio	Booth 79	Roeth Vibrator Co. Booth 1 Chicago, Ill.
Will feature concrete paint, exterior and interior, and floor paint; also a display of Medusa white cement.		T. L. Smith Co. Booth 26-27-28-29 Milwaukee, Wis.
Multiplex Concrete Machinery Co. Booths 46-47-48 Elmore, Ohio		Will display truck mixers and various sizes of contractors' mixers.
Will exhibit an automatic tamper; power press; new batch mixer and a line of hand machines.		Stearns Manufacturing Co. Booths 7-8-9-10 Adrian, Mich.
National Chemical & Mfg. Co. Chicago, Ill.	Booth 70	Will have a working exhibit featuring the following: Stearns Jolcrete machine, employing the process of limited amplitude vibration to the manufacture of concrete products; Power Stripper for making concrete block, brick and tile; Stearns Jr. Stripper, a hand-operated machine convertible to power operation; Stearns Clipper Stripper, a new machine available in five models; a mixer, direct-driven by a geared-head motor; Skip Loaders for charging mixers with dry materials and for charging molding machines with mixed concrete.
Neptune Manufacturing Co. Los Angeles, Calif.	Booth 71	Superior Concrete Accessories, Inc. Booth 104 Chicago, Ill.
Will feature contractors' form accessories such as wire tie buttons, removable spacers and adjustable screed supports.		Will feature contractors' form accessories; clamp ties, bar supports and spacers for reinforcing steel.
Polk Genung Polk Co. Fort Branch, Ind.	Booth 43	Superrock Co. Booth 105 Birmingham, Ala.
Manufacturer of circular form systems, coal pockets, silos and tanks.		Manufacturer of lightweight blast furnace slag aggregate.

"COMMERCIAL" CORED PALLETS

Are the foundation most satisfactory for Cement, Cinder and tile blocks because—

Better blocks, quicker and greater production and better curing result from their use.

Commercial pallets are designed to fit low cost machinery, with its lower priced special attachments.

Less weight to handle than plain pallets, less storage space required when not in use.

Long life—will not break or crack—no fire hazard.

Ask about Commercial Cored Pallets when replacing or buying new equipment.

We will be at the Exposition—space 23—with representative styles.



The COMMERCIAL SHEARING & STAMPING COMPANY
YOUNGSTOWN, OHIO

Transit Mixers, Inc. Booth 42
New York, N. Y.
Manufacturer of truck mixers.

Union Steel Products Co. Booth 51
Albion, Mich.
Manufacturer of contractors' form accessories.

Universal Form Clamp Co. Booths 11-12-13
Chicago, Ill.

Waylite Company Booth 78
Chicago, Ill.

White Steel Monolithic Systems Booth 78
Chicago, Ill.



QUINN PIPE FORMS
HAND or WET PROCESS

Make concrete pipe on the job with Quinn Concrete Pipe Forms. Get complete information on prices and special construction features of Quinn Forms. Give us size of job for estimate on your pipe form needs.

HEAVY DUTY **MEDIUM DUTY**

Built for many years of service—sizes for any diameter pipe from 12 to 64 inches—any length—tongue and groove or bell end.

Makes same sizes pipe as "Heavy Duty" but built to meet demand for lower cost equipment to produce uniform quality in smaller amounts.

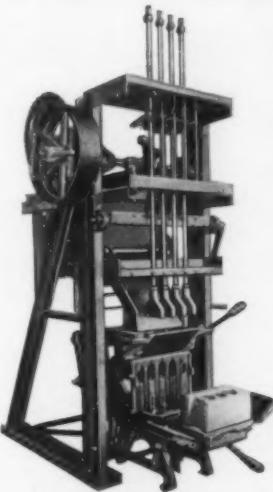
Also manufacturers of concrete pipe machines for making pipe by machine process.

QUINN WIRE & IRON WORKS 1603 12 St. Boone, Iowa

New Plants

BAY CONCRETE CO., Port St. Joe, Fla., has a permit to construct a cement block plant on E. Fourth St. Other concrete products also will be made.

KRIS NIELSEN, Rochester, Minn., gravel dealer, will erect a cement block plant on land purchased from the city.



"ANCHOR"

Complete equipment for making concrete, cinder and other light weight aggregate units, including engineering service for plants and revamping of old ones for more economical service. Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns mixers, pallets, Struc-blox Oscillating attachments, etc. Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mch. Co.

G. M. Friel, Mgr.

Columbus, O.

DOLOMITE MARBLE

CaCO₃ MgCO₃
Ground or Pulverized
Universal Marble Products Corp.
THORNWOOD, N. Y.

STAR and ANCHOR COLORS

Geo. S. Mepham Corp., East St. Louis, Ill.
C. K. Williams and Co., Easton, Penn.

CEMENT COLORS

Will not fade—extra fine and strong
TAMMS SILICA COMPANY
228 North La Salle St. Chicago, Illinois

CONCRETE PAINT

TAMTEX

WATER CEMENT PAINT
in Powder Form
Waterproofs and Beautifies Concrete Products
Write for Color Card
TAMMS SILICA COMPANY
228 North La Salle St. Chicago, Illinois

New Sales Manager for Besser

HAAKON PAULSON was recently named general sales manager by the Besser Manufacturing Co., Alpena, Mich. Mr. Paulson is well known to the industry.



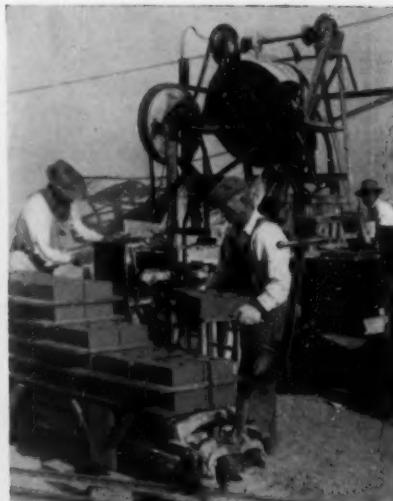
Haakon Paulson

particularly in the Northwest, where he has been selling concrete block equipment for 18 years. Mr. Paulson pioneered in the sale of block machinery made in Minneapolis, Minn., and other equipment.

In 1926, he became associated with the Anchor Concrete Machinery Co., then at Columbus, Ohio, and when Anchor, Ideal and Universal were consolidated in 1928, he sold and serviced these machines until 1932.

With the sale of the Consolidated Concrete Machinery Corp. to the Besser Manufacturing Co., Mr. Paulson became active in the sales and service of the Besser line of automatic machinery and the Consolidated Concrete Corp.'s equipment in Minnesota, Wisconsin, North Dakota and South Dakota. He is now located at Alpena, Mich.

JOHNS-MANVILLE, New York, N. Y., has published "Transite Pressure Pipe", a new attractively illustrated book, tracing the development of asbestos-cement pipe and describing how it is manufactured. Tests made on Transite pipe in the Johns-Manville factories are fully described and data on the cost of pumping water is given as well as statements made by water department officials in towns where Transite pipe has been installed. Information is also included on methods of installing the pipe, assembly of couplings and the making of service connections. Copies of this book, Form TR-11A, are available on request to Johns-Manville, 22 East 40th St., New York, N. Y.



The SENSATION of the CONCRETE INDUSTRIES SHOW

Featured by lowest possible cost, both as to initial investment and operation, this new FLAM CONCRETE TILE MACHINE offers every concrete products producer an opportunity to build a highly profitable business.

Makes all sizes from 2" to 8" high. 8-hour capacity: 2500 Standard 8" Tile; 3200 Standard 6" Tile; 4500 Standard 4" Tile; or 8000 Standard Brick.

Contains no gears, clutches or other troublesome parts. Total weight less than 500 lb. Can be used for permanent or portable plant.

It will pay you to investigate. Write for complete details.

On display at Booth 87, Concrete Industries Exposition

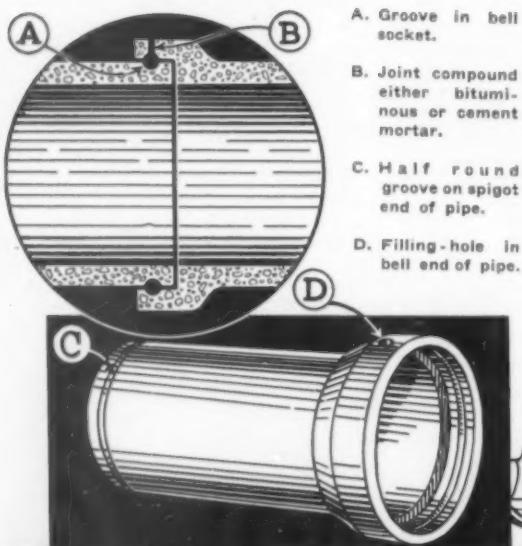
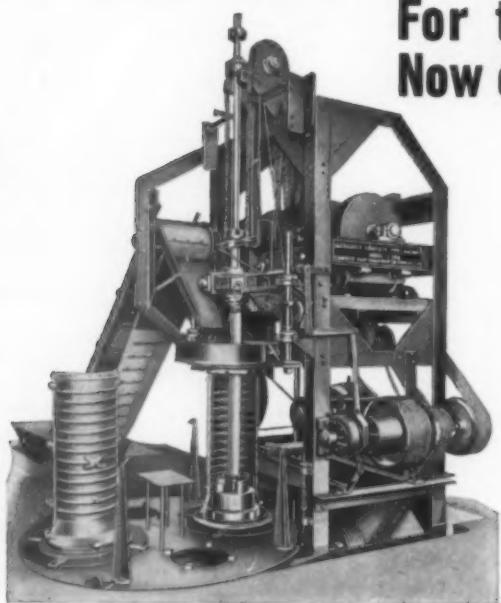
• Typical units made on FLAM machine



STEPHEN FLAM
Concrete Tile Equipment
SHERMAN OAKS, CALIF.

THE DUAL PACKER HEAD RECOGNIZED FOR YEARS AS THE ECONOMICAL CONCRETE PIPE MACHINE

For the making of small pipe . . . Now offers the same economy in sizes up to 36 inches.



Packs a 4" wall to the same density that Packer Head packs a $1\frac{1}{2}$ " wall. Does not twist or tend to rotate the cage.



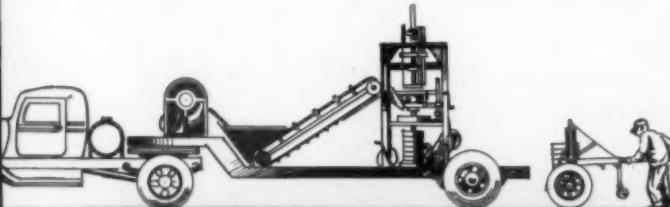
ROLLER PACKER HEAD

What the Dual Packer Head System has meant to small (4" to 24") pipe, the New Roller Head now means to intermediate (24" to 36") sizes. It has added 50 per cent in strength, the same comparative speed of production, the elimination of pallets, which now spells ECONOMY all the way from 4 to 36 inch on ONE MACHINE. Also substitutes one elliptical for two lines of reinforcing saving 20 to 30 cents a foot. Another EXCLUSIVE FEATURE.

New Sealtite Joint*

A New Patented Joint which will prove very desirable to City Engineers, because it eliminates leaky joints. Faulty joints cause cesspool contamination of the ditch line and excessive infiltration, which greatly overburden expensive Disposal Plants. This Dual Packer Head machine enjoys exclusive rights to make the Sealtite Joint on bell and spigot pipe and is one of two machines that can use it on tongue and groove pipe.

*The Sealtite Joint available to Hand Cast manufacturers. Write Kansas City Concrete Pipe Co., North Kansas City, Mo.



NOTICE: Purchaser of the New Dual Packer Head machine also buys the right to lease a Portable Machine which makes possible the handling of jobs beyond the reach of one's permanent location. This leasing policy eliminates the transportation problem and helps sell the pipe because it is made with local labor and local materials. This leasing right is limited to customers of

CONCRETE PIPE MACHINERY CO.
SIOUX CITY IOWA U.S.A.

• NEWS • OF • THE • MONTH •

House-Warming

LONE STAR CEMENT CORP., Penn. Division, Nazareth, Penn., formally opened its new office and service buildings on December 14.

The program began with an address of welcome by the chairman of the committee, R. G. Sutherland and was followed with the formal dedication of the new buildings by E. C. Champion. Charles L. Hogan, president of Lone Star, who came from New York especially for the occasion, was introduced and spoke on the past and future of the cement industry. Other speakers included Thorkild Avnsoe, vice-president in charge of manufacturing operations in New York, and Edwin Smith of the machine shop force.

A locker-room, wash and shower rooms, and sanitary facilities for all employees are contained in the new service building which is reinforced concrete of modernistic design. The entrance to the service rooms is through a glass paneled "lounge" which has the appearance of a sun room.

The new office or administrative building contains all the laboratories on the first floor and the offices on the second floor. This also is a modernistic and reinforced concrete structure.

Totally indirect lighting is used in the office and semi-direct is used in the laboratories. The physical laboratory has air conditioning equipment for temperature and humidity control. Locker rooms with showers and other facilities have also been provided for the office and laboratory forces and an individual steam heating and water heating plant is housed in the main building.

To Rebuild Cement Plant

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., has a two-year program, to begin early in the Spring, involving the renovation and rebuilding of the major part of the Cape Girardeau plant, according to an announcement by President W. A. Wecker who, in company with other officials, recently made an inspection of the plant. In making the announcement President Wecker said, "Specifications for the product are becoming more exact each succeeding year and we are also called upon to make special cements involving variations in the chemical composition. In order to meet these more exacting demands and to make the special cements with greater facility and efficiency, we are now contemplating a program of improvements for placing the making of our mixes

under what we would call hair-breadth control. This does not mean enlargement of the plant, but merely replacement of equipment rendered obsolete by exacting demands of the present and future."

Need 1,500,000 Homes

PRESIDENT I. J. HARVEY, JR., of the Flintkote Co., in a recent statement said that the cost of building a house is not too high when measured by purchasing power, and the same number of dollars today will buy a more efficient, convenient, cheaper-to-operate house than in 1925. Mr. Harvey believes in liberalizing the National Housing Act to permit the raising of insurable limits of a mortgage from 80 percent to 90 percent of a property's appraised value when the cost is under \$6000. He pointed out that houses falling below the \$6000 cost figure represent the large mass market, and it is indicated that some 1,500,000 new homes are needed to house adequately the low income group of our population.

Undeveloped Property

GIANT PORTLAND CEMENT CO., Philadelphia, Penn., still owns a 1000-acre tract in Pleasant Valley, N. Y., acquired originally for a projected plant. This fact was brought out when the company recently protested the proposed abandonment of the Poughkeepsie-Stissing branch of the New York, New Haven & Hartford R. R.

Barn Fires

UNIVERSAL ATLAS CEMENT CO., Northampton, Penn., plant recently lost by fire a frame barn and 50 tons of alfalfa hay. It is reported locally this is the fourth barn the company has lost by fire in the past three years. ("Concrete for Permanence.")

Fight Income Tax

IN AN ACTION brought against the Tennessee-Arkansas Gravel Co., Memphis, Tenn., C. P. Stanley, secretary of the company, testified before the U. S. Board of Tax Appeals that the company does not owe the government \$1,915.54 in income tax and \$384.06 in excess profits tax for 1934 as charged by the Internal Revenue department. He said that neither the Tennessee-Arkansas Gravel Co., nor the Mississippi River Gravel Co., formed largely from assets of the Tennessee-Arkansas firm, made any money in 1934. Mr. Stanley said the Mississippi

River Gravel Co. was formed in Mississippi by operators of the Tennessee-Arkansas Gravel Co., because they wanted to supply materials for the Mississippi highway program and "because the highway commissioner said materials would be bought only from Mississippi firms."

Magnesite Deposit

HIGH-GRADE MAGNESITE deposits are reported to have been discovered in Stevens county, Washington, according to Dr. A. E. Drucker, director of the mine experiment station at Washington State College. Dr. Drucker holds the belief that there are possibilities for a new industry for the production of magnesium metal from abundant raw material in Stevens county. The proximity of cheap power at Bonneville and Coulee dams should prove to be an incentive.

Topsoil Sale Illegal?

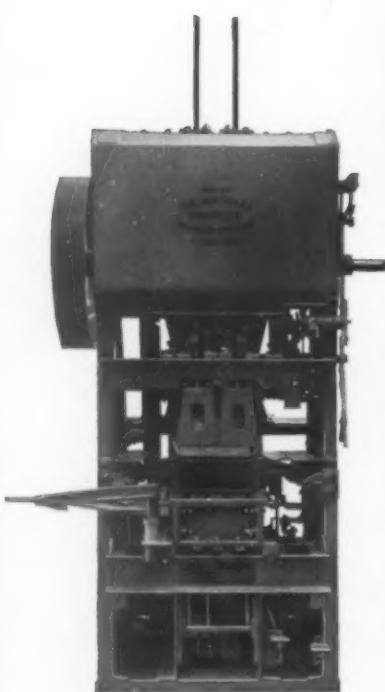
QUEEN ANNE SAND AND GRAVEL CO., Seattle, Wash., was recently threatened with court action to prevent the removal and sale of topsoil from property adjacent to its sand and gravel pit which was closed down. Sand is being obtained by the company from another source. R. M. Frost, president of the company, stated that permission had been obtained to remove the top soil for sale to the WPA. An ordinance has been passed by the City of Seattle compelling all gravel pits within the city to procure permits.

Increased Freight Rates

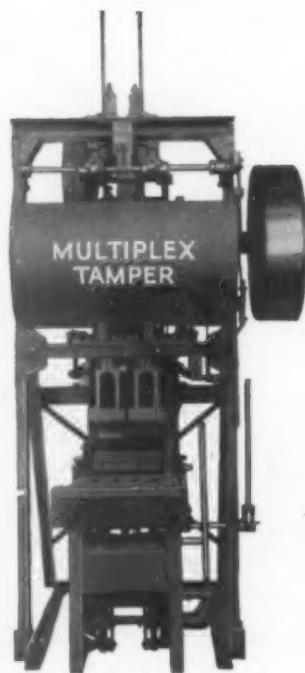
INCREASES IN INTRASTATE FREIGHT rates in Utah, ranging from $\frac{1}{2}$ cent to $2\frac{1}{2}$ cents per 100 lb., comparable with those allowed by the Interstate Commerce Commission, have been authorized by the Public Service Commission of Utah. The State Commission, however, exempted nearly all rock products, including: asphalt rock, insulating material, gypsum rock, lime and plaster, ground or crushed limestone, silica, sand, gravel and crushed rock.

Quarry Labor Goes CIO

ANNOUNCEMENT has been made by the Committee for Industrial Organization that the Quarry Workers' International Union, comprising 8000 members, has seceded from the American Federation of Labor to affiliate with the CIO. The secession came a week after peace negotiations between the rival groups collapsed, indicating another raid on A. F. of L. unions.



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MULTIPLEX has a complete line of hand and power operated machines. Twenty different models from which to choose.

Machines ranging in capacity from 400 to 3000 units per day of the 8"x8"x16" size, and other sizes. Check your requirements.

Hand Machines	Power Machines
Double Strippers	Power Presses
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Random-Ashlar Machines	Mixers
Brick Machines	Cars
Moulds, Forms	Racks

Complete plants installed.

Write for literature and catalogs on our block machines.
See them at the

CONCRETE INDUSTRIES EXPOSITION
Chicago, Hotel Sherman, Feb. 8-11

POWER
PRESS



The Multiplex
CONCRETE MACHINERY CO.

ELMORE, OHIO

ROCK PRODUCTS

Public-Spirited

NATIONAL GYPSUM CO., Buffalo, N. Y., has deeded back to the Mobile Chamber of Commerce 25 acres of its 65-acre industrial site at Mobile, Ala., in return for the \$50,000 which the new industries committee of the chamber raised for that concern when it decided to locate there. The remaining 40 acres is considered ample for the company's needs and construction of the plant has begun.

New Owner

GULF GYPSUM CO., Houston, Tex., with mine at Falfurrias, Tex., has been purchased by the Celotex Corp., Chicago, Ill. The Celotex Corp. has hitherto been a manufacturer of pulp board only and has a large plant at New Orleans, La.

Lime Dust

UNITED STATES LIME PRODUCTS CO., San Francisco, Calif., has been ordered by the Superior Court to install dust arrestors or dust collectors at its Sonora, Calif., lime plant on the complaint of a neighboring vineyard owner. Many vineyard and orchardists pay good prices for lime, but here is one who has convinced the court free lime is damaging to his crops.

Sand Company Expands

MIZPAH SAND & GRAVEL CO., Mizpah, N. J., recently completed a railroad siding into a new sand and gravel plant at Jones' Mill, Port Elizabeth, N. J., eight miles from Millville, N. J., in the famous Millville sand belt. This property was prospected and leased to Daniel Passarello, owner of Mizpah Sand & Gravel Co., by Claude N. Terry. Mr. Passarello also is opening another plant in Landis township at Forge Ave., and Bennet Mill Rd.

Government Competition

BUCHANAN COUNTY, Mo., has been granted \$120,000 by WPA for rock-crushing projects; two new quarries will be opened, making six in all.

MUSCATINE COUNTY, Ia., produced from four quarries—two owned by the county, and two leased—51,897 cu. yd. of crushed stone in the three years 1935, 1936 and 1937. The "average cost to the county" is reported as 97c per cu. yd., but this does not include the purchase price of the two owned quarries, nor royalties on the other two, nor any cost for labor, which was furnished "free" by WPA, nor any other cost apparently but the operating cost of the equipment.

New Crushing Plant

SATICOV ROCK CO., Ventura, Calif., is reported to have recently opened the most modern rock crushing and gravel plant in the United States, costing about \$100,000. Designed to handle 125 tons of rock and gravel per hour, the power plant equipment delivers 350 hp. to the conveyors and crushers. The crusher tower is built of reinforced concrete and steel. A feature of the construction is the "floating power" suspension of the heavy crushing machinery on cables so that vibration is not transmitted to the building.

Restrain County Sales

ALFRED AND PETE KARITIS, South Bend, Wash., crushed rock and gravel producers and distributors, have filed action in the Superior Court, seeking to have the county board restrained from selling crushed rock and gravel to private consumers. The complaint further asserts that it is a violation of state law for the county to sell such products to private parties.

Limestone Shipments

LIMESTONE PRODUCTS CORP., of America, has issued a report on shipments for three calendar years: 1937, 169,851 tons; 1936, 133,982 tons; 1935, 83,281 tons.

December Statistics on Cement Production

PORTLAND CEMENT INDUSTRY in December, 1937, produced 7,044,000 bbl., shipped 4,780,000 bbl. from the mills, and had in stock at the end of the month 24,899,000 bbl., according to the Bureau of Mines. Production and shipments of Portland cement in December, 1937, showed decreases of 21.5 and 23.5 percent, respectively, as compared with December, 1936. Portland cement stocks at mills were 8.9 percent higher than a year ago. The preliminary totals of production and shipments for 1937 show increases, respectively, of 3.4 and 1.0 percent from the final totals for 1936.

The statistics here given are compiled from reports for December, received by the Bureau of Mines, from all manufacturing plants except one, for which estimates have been included in lieu of actual returns.

In the following statement of relation of production to capacity, the total output of finished cement is compared with the estimated capacity of 160 plants at the close of December, 1936 and 1937.

	December	Nov.	Oct.	Sept.	1936	1937	1937	1937	1937
The month	40.3	32.2	43.7	52.0	53.1				
The 12 months ended	42.7	45.3	46.0	46.7	47.1				



The Service Record of this wire rope continues to make and hold friends.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.
Established 1857

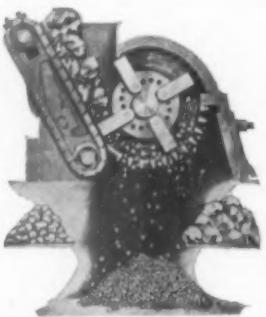
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Quality

- A Product of the Finest Materials and Craftsmanship.
- Maximum Screening Efficiency.
- Large Capacity with Lowest Handling Cost Per Ton.
- Reliable and Most Economical.
- Tried, Proved, Guaranteed. Priced \$296 and up.

Write for Catalogue today.

UNIVERSAL VIBRATING SCREEN CO.
RACINE, WISCONSIN



DIXIE NON-CLOG HAMMERMILLS and REGULAR STATIONERY BREAKER

Unexcelled for Primary, Secondary or Fine reduction.

Will reduce any material, wet, dry or sticky, to any given size in a single operation with absolute uniformity. Note particularly the moving breaker plate, an exclusive DIXIE feature, which provides 26 times the average wearing area and assures absolute freedom from clogging. 40 sizes to choose from.

Write for complete details.

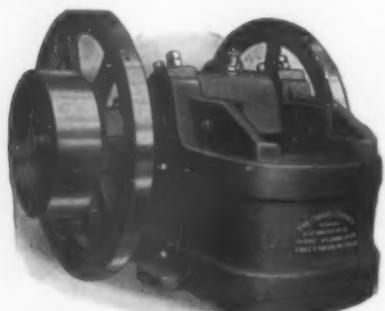
DIXIE MACHINERY MFG. CO.

4109 Goodfellow Ave. ST. LOUIS, MO.

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Complete Plants
Designed and
Equipped.

Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.



EARLE C. BACON, Inc.
17 John Street New York, N. Y.

Install New Equipment

THE MANNING AND LOCKLIN NORTHVILLE Co., Detroit, Mich., large sand and gravel producer, is now installing new equipment to improve its products and speed up production in anticipation of a marked increase in demand for sand and gravel which will follow the government plans for stimulation of building. L. Perry Manning, vice-president of the company, reports that the Northville plant has a daily capacity of over 1,000 cu. yd. a day. He stated that all materials produced are washed, screened and graded according to the Michigan Highway department standard specifications.

Fire and Water Damage

WINONA SAND & GRAVEL Co., Winona, Minn., reports that a fire of undetermined origin caused considerable damage to the company machine shop at gravel pit No. 4, Minnesota City road.

CANYON ROCK & GRAVEL Co.'s Mission gorge plant near San Diego, Calif., suffered a loss from fire of about \$40,000. The crusher, which was not in operation when the flames started, provided crushed rock and gravel for many local construction jobs.

JOHNSON ROCK & GRAVEL Co., on Butte Creek near Chico, Calif., sustained damages estimated at from \$2000 to \$3000 as a result of high water. Some valuable motors were under water and materials were carried away by the flood.

Celebrating Silver Anniversary

AN ANNIVERSARY BOOK has been published by the Atlas Powder Co., Wilmington, Del., to record the progress in research and manufacturing methods during the 25 years of this company's existence. The company issued the book with the three-fold purpose of giving grateful recognition to all the employees and particularly those who served for 25 years; as acknowledgement of appreciation of patronage; and as a presentation to the stockholders of the company's activities and progress in many fields.

Films on Welding

THE JAMES F. LINCOLN ARC WELDING FOUNDATION, Cleveland, Ohio, sponsor of the \$200,000 award program, has prepared a series of slide films portraying the application of electric welding to various products and structures. These slides have been prepared for educational purposes, and are a part of the Foundation's plan to encourage scientific progress of the arc welding industry. They are being made available for showing by engineering societies, technical clubs, trade schools, engineering colleges, universities, and other groups.

Sell Coulee Gravel Plant

BUREAU OF RECLAMATION officials have been reported as authorizing the sale of the Grand Coulee Dam's huge concrete mixing plant, the gravel plant, and all buildings at Mason City and transmission lines from Coulee City, Wash., to the site of the dam, for the lump sum of \$500,000. The M-W-A-K Company, contractors for the foundation of the dam, will sell the listed improvements to the next contractor, probably the Interior Construction Co.

Obituaries

WILLIAM ADRIAN, manager of the Kinsman Sand & Gravel Co., Kinsman, Ohio, passed away recently after only a four days' illness of pneumonia. Mr. Adrian was born July 31, 1896, in Akron, Ohio. For the past 20 years he had been associated with the sand and gravel business. In July, 1933, Mr. Adrian moved from Bedford, Ohio, to Kinsman, and was instrumental in organizing the Kinsman Sand & Gravel Co.

WALTER EMMETT TATE, vice-president and general manager of the Georgia Marble Co., Tate, Ga., was killed in an automobile accident near Ellijay, Ga. He was 59 years old. Mr. Tate, a native of Tennessee, was educated at Wall and Money School and at Emory University. After completing his education, he became identified with the Georgia Marble Co. With his brothers, Colonel Sam Tate, president of the company and former chairman of the Georgia State Highway Board, and Luke Tate, he helped establish the business as one of the most successful in the state. In addition to his two brothers, he is survived by two sons, a daughter, and two sisters.

BENJAMIN F. STRADLEY, a pioneer in the cement industry, died recently at his home in Indian River City, Fla. He was 85 years old. Back in the 80's, Mr. Stradley held the only agency in this country for German cement. He later became vice-president of the Vulcanite Portland Cement Co., and he was president of the Bath Portland Cement Co., Bethlehem, Penn., when it was sold to the Lehigh Portland Cement Co. Mr. Stradley retired from the cement business in 1924.

ALFRED M. LUTTRELL, general manager of the Consolidated Rock Products Co., plant at Brooksville, Fla., died recently. Mr. Luttrell was 57 years old.

GEORGE B. POORE, vice-president of Calaveras Cement Co., died on January 14 at San Andreas, Calif. He was 69 years old.

New Concrete Brick

PYRAMID GYPSUM CO., Salt Lake City, Utah, has started the construction of a modern cinder concrete brick plant at Jerome, Idaho. A new type of material will be used in the manufacture of brick and kindred products, using cinders found in the extinct volcanic craters of the Moon region and in other places in southern Idaho for aggregates. Similar plants will be built at Blackfoot and Nampa. Manufacture involves a floatation process in which the lava rock is separated from the cinder formation. The lava has a heat conducting property and must be removed in order to give the bricks insulation value. In addition to the manufacture of brick, the plant will make reinforced concrete ceiling joists, insulation and acoustic plaster, and other building material. The plant will cost about \$20,000.

Winter Operation

LEHIGH PORTLAND CEMENT CO., Metline Falls, Wash., will operate all winter to capacity, according to Spokane newspapers. The plant is to work on a new 150,000-bbl. contract for cement for the new high dam at Grand Coulee, Wash.

GLENDALE, CALIF., residents have opposed the granting of a permit to open a quarry in Verdugo Canyon. Members of the Verdugo Canyon Advancement Association have contended the proposed quarry would depreciate the value of their homes. The site of the proposed quarry is known as the Le Mesnege estate.

THE QUARTZITE STONE CO., Lincoln, Kan., closed down temporarily in December due to weather condition and lack of immediate orders. The company has been trying to contract crushed stone to the highway department for future delivery in order to provide its employees with steady work, but so far this arrangement has not been completed.

PENNSYLVANIA-DIXIE CEMENT CORP., Clinchfield, Ga., resumed production January 8, after a 60-day shutdown.

Concrete Pavement Yardage

Awards of concrete pavement for December, 1937, have been announced by the Portland Cement Association as follows:

Type of construction	Sq. yd. awarded during Dec., for year to date	Total sq. yds. Dec. 31, 1937
Roads	2,303,289	39,670,238
Streets	1,586,000	13,845,273
Alleys	133,412	663,238
Total	4,022,701	54,178,749

Bonuses

OKLAHOMA PORTLAND CEMENT CO., Ada, Okla., paid a Christmas bonus of 10 percent of each employee's wages for the year 1937, including those with five months' continuous service who were laid off during October or thereafter. The total amount paid was over \$30,000.

IDEAL CEMENT CO., Denver, Colo., is reported to have paid Christmas bonuses to employees of all its plants.

LONE STAR CEMENT CORP., New York City, paid Christmas bonuses of two weeks' pay to all employees.

JONES CONCRETE PRODUCTS CO., Elsmere Junction near Wilmington, Del., reports a fire loss estimated at \$8000. H. P. Jones, owner, said that machinery valued at \$15,000 was housed in the buildings and had been recently overhauled before starting production.

THE SENECA STONE CO. recently reopened the old quarry on West 7th St., Tulsa, Okla. J. E. Williamson, manager, reports that 200 tons daily of high grade limestone are being loaded out of the quarry. Limestone dust will be available for fertilizer.

Sand, Lime Brick Production and Shipments

The following data are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States. They may be considered representative of the industry.

Twelve active sand-lime brick plants reported for December and eight for November, statistics for which were published in January.

Average Prices for December

	Plant	Delivered
	Price	Price
Syracuse, N. Y.	\$14.00	\$16.00 [†]
		20.00 [†]
		15.00 [†]
Detroit, Mich.	...	16.00
Minneapolis, Minn.	10.00	...
Pontiac, Mich.	12.50	14.00
Saginaw, Mich.	10.90	...
Milwaukee, Wis.	10.00	12.50
Watertown, Mass.	...	10.50
Madison, Wis.	11.50	13.00
Grand Rapids, Mich.	11.00	...

[†]Carlot. [‡]Less Carlot. [§]Carlot to Dealers.

Statistics for November & December

	Nov. [†]	Dec. [‡]
Production	2,248,100	1,671,850
Shipments (rail)	912,095	501,000
Shipments (truck)	1,459,139	1,365,199
Stock on hand	2,209,362	2,959,756
Unfilled orders	2,152,000	2,111,000

[†]Eight plants reporting; incomplete, two not reporting unfilled orders and three not reporting stock on hand.

[‡]Twelve plants reporting; incomplete, six not reporting unfilled orders and four not reporting stock on hand.

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8 yards a minute with the Haiss "135" Loader—and no fooling. 24,000 pounds of all-steel digging and loading ability—with the drive of a 65 H.P. motor to give it POWER. Nothing flimsy—or cheap.

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PORTABLE BELT CONVEYORS—BUCKETS

PYRASTEEL
for high temperatures

EVANSTEEL
for hard service



DRAG CHAINS made of EVANSTEEL are ideal for heavy duty with temperatures up to 1000° F—and of PYRASTEEL for temperatures from 1000° to 2200° F.

You will save money on your replacements if the parts are made of EVANSTEEL or PYRASTEEL.

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CHICAGO STEEL FOUNDRY CO.

Makers of Alloy Steel for over 25 years.

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AIR SEPARATORS

220 STURTEVANTS sold on approval for Cement. Not one rejected.

"HIGH EARLY" and regular cement 1500-3300 S.S. Area.

Engineered Installations for raw or clinker show 25 to 100% capacity increase.

STURTEVANT MILL COMPANY

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BOSTON, MASS.

THE ROSS FEEDER

Completely controls the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

High in efficiency. Low in maintenance and power consumption.

Furnished in sizes to suit your operation. Send full particulars for recommendation.

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THE INDUSTRY

New Incorporations

Associated Sand & Gravel Co., Inc., 11 Pemberton Sq., Boston, Mass., has been incorporated with a capital of 100 common shares of no par value. Officers include: president, Frances A. Griffin; treasurer, Victoria Kazanjian; and clerk, Bertha C. Fogarty.

Corinth Sand & Gravel Co., Inc., Rotterdam, N. Y., is the name of a new corporation which has been organized to operate sand and gravel pits. Capital comprises 120 shares of no par value. Strong & Golden, 128 Wall St., Schenectady, N. Y., are the incorporators. The directors of the corporation are: Francis L. Wellenreiter, R. D. 3, Schenectady; Raymond A. Bathrick, Clifton Park; Nicholas G. Massotti, 214 Park Place, Schenectady; Henry G. Stremoyer, 48 Wall St., Amsterdam; and Walter E. Ellers, R. D. 3, Schenectady.

Vermont White Granite Quarries, Inc., Brattleboro, Vt., has been incorporated and will lease the West Dummerston Granite quarries of the Presbrey-Leland Quarries Co. Earl D. Baldwin, one of the incorporators, is now operating the quarries and will serve as president and treasurer. Capital stock will be 50 shares at a par value of \$100 a share. Incorporators are Mr. Baldwin, Julia J. Baldwin, Jettie R. Baldwin and Douglas L. Tupper.

North Shore Sand and Gravel, Ltd., is the name of a new company in Vancouver, B. C., which has been incorporated with a capital of \$20,000.

Pyramid Insulation Co., Jerome, Idaho, has been incorporated by interests representing the Pyramid Gypsum Co., Salt Lake City, Utah. A brick factory will be erected in Jerome this winter.

Rockwood Gypsum Co., 228 N. La Salle St., Chicago, Ill., has been organized to deal in and process gypsum plaster, blocks, etc. Capital stock comprises 25,000 shares \$10 par value preferred and 100,000 no par value common. Incorporators of the new enterprise include: W. T. Koken, C. D. Lukens, John T. Williams; correspondent, Margaret L. Middlekauff, 38 N. La Salle St., Chicago, Ill.

Parkersburg Sand and Gravel Co. was recently incorporated in West Virginia with a capital stock of \$5000. The incorporators are C. Z. Ruth, L. O. Edelen and L. S. Clark, all of Parkersburg, W. Va.

Oceola Stone Co., Inc., Oceola, Ohio, will start production about March 15 of all sizes of crushed stone and agricultural limestone. The plant is located at Oceola on State Route 30N. Incorporators are: Matt Otto, Virgil Horn, Chester Reiff, Walter Gearhart and H. E. George, all of whom were formerly connected with the National Lime and Stone Co.

Delaware Sand Gravel Co., New Castle, Del., has been incorporated to deal in sand, gravel and clay of all kinds. Capital consists of 250 shares, no par value, and the incorporators are Daniel DiPace, Gertrude M. Williams, August F. Walz, all of Wilmington, Dela.

Dixie Rock Asphalt Co., 134 S. La Salle St., Chicago, Ill., has been organized to own, mine, operate, control, lease mines or fields bearing asphalt. The company is incorporated with a capitalization of 250 shares of preferred at \$100 per share, par value, and 10,000 shares of common, \$1.00 par value. Incorporators are: L. A. Fosse, James M. Hayden, Mrs. Lee D. Greeley; correspondent, John H. Gatley, 134 S. La Salle St., Chicago, Ill.

Transit Mix Concrete, Inc., Orlando, Fla., has been incorporated by C. F. Culver, C. M. Dunham, and O. J. Bailey, who will be directors of the company. Capital comprises 1000 shares at \$20 par value.

Powell County Limestone Co., Frenchburg, Ky., has been incorporated with a capital of \$5,000. J. C. Stacy, Henry Wells and Earl Spencer are the incorporators.

Manufacturers

James B. Seaverns, whose connection with the rock products field dates back over 25 years, has entered business for himself with offices at 241 Jones St., San Francisco, Calif. He was last identified with the Bodinson Manufacturing Co., of San Francisco. Mr. Seaverns will manufacture steel bins and structural steelwork for the various rock product industries. In his past connection with the industry, he was active in designing and equipping crushing plants.

Nordberg Manufacturing Co., Milwaukee, Wis., reports that George Sullivan, Pacific Coast manager, Subway Terminal Bldg., Los Angeles, Calif., will have under his direct supervision all future crushing business. Heretofore, Mr. Sullivan has devoted most of his efforts to the sale of the heavy machinery, consisting of Diesel and steam engines, mine hoists, and compressors. He will continue to supervise these sales, but the major portion of his time will be devoted to Symons cone crushers.

Oliver United Filters, Inc., advises that J. H. Mitchell-Roberts, export manager, recently left Manila, Philippines for Melbourne, Australia, where he will spend several months with the company's agent, Crossle & Duffy Pty, Ltd.

The Multiplex Concrete Machinery Co., Elmore, Ohio, has announced through President Frank Muenzer the appointment of two new representatives: Ziegler Machinery, Inc., 528 First Ave., Pittsburgh, Penn., and the Cunningham-Ortmayer Co., 429 W. Michigan St., Milwaukee, Wis. The Ziegler company will represent Pennsylvania territory and the counties in Ohio and West Virginia bordering the State lines. Cunningham-Ortmayer will represent the entire State of Wisconsin and the upper peninsula of Michigan.

The Brooks Equipment and Manufacturing Co., 408 Davenport Road, Knoxville, Tenn., is the name of a new company formed by the consolidation of the Brooks-Payne-Osborne Equipment Co., and the Day Pulverizer Co., both of Knoxville. The Brooks Equipment and Manufacturing Co. will continue as distributors for the Bucyrus-Erie Co.

Cutler-Hammer, Inc., Milwaukee, Wis., has announced the organization of Canadian Cutler-Hammer Limited for the purpose of manufacturing Cutler-Hammer motor and generator control products for the Canadian market. The new company's headquarters will be at 384 Pape Ave., Toronto, 6, Canada.

GAR WOOD

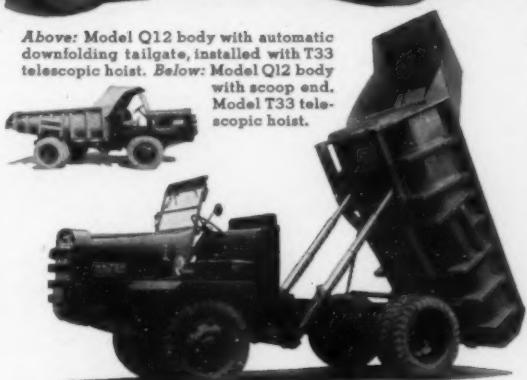
HEAVY DUTY UNITS

FOR Quarry Work

• Compare Gar Wood's exclusive advantages on outside mounted telescopic hoists and extra heavy duty bodies, equipped with patented downfolding tailgates, or scoop ends, box-type side reinforcing members and other construction features. Built in a complete range of types and sizes.



Above: Model Q12 body with automatic downfolding tailgate, installed with T33 telescopic hoist. Below: Model Q12 body with scoop end. Model T33 telescopic hoist.



Special heavy duty side dump trailer units, developed for strip mining, also available for quarry work.

• Let us send literature describing this equipment, also the new, improved units for 1½-2 ton trucks; cam and roller hoists and "W" and "L" dump bodies for heavy duty trucks and trailers.

GAR WOOD INDUSTRIES, INC.
7924 RIOPELLE ST. • DETROIT, MICHIGAN
WORLD'S LARGEST MANUFACTURER OF TRUCK EQUIPMENT—
Hoists and Bodies—Truck Tanks—Winches, Cranes. Also Trailbuilders,
Bulldozers, Hydraulic Scrapers, Rippers—Car Pullers.



EAGLE SCREW WASHER

Daily recovers over six cars of sand formerly wasted

Eagle Screw Washer Daily Recovers Over Six Cars of Sand Formerly Wasted.

The Concrete Materials Corporation of Waterloo, Iowa, installed this 18 inch twin screw washer which recovers commercial sand able to qualify for the Illinois State Specifications. Before this installation only gravel was produced and the sand pumped back into the lake, a total loss.

Two other pieces of EAGLE equipment play a very important part in the remarkable production record of the plant. A 40 foot "Swintek" ladder mounted on a barge is used for excavating, and a 20-inch twin screw EAGLE WASHER effectively washes and dewateres about 80 tons of sand per hour for mixing with gravel to meet the specifications for ballast.

This is only one of countless ways EAGLE WASHERS are building big profits for producers everywhere.

Our engineers are specialists in all aggregate washing problems. Let us help you solve yours. Write today for details.

EAGLE IRON WORKS
DES MOINES, IOWA

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 118

Admixtures (Aggregate)
Calcium Chloride Ass'n.
Aggregates (Special)
Calcium Chloride Ass'n.
Tamm's Silica Co.
Agitators
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Smith, F. L., & Co.
Traylor Engineering & Mfg.
Co.
Air Compressors
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
Fuller Co.
Gardner-Denver Co.
General Electric Co.
Ingersoll-Rand Co.
Nordberg Mfg. Co.
F. L. Smith & Co.
Traylor Engineering & Mfg.
Co.
Alloys (Metal)
Chicago Steel Foundry Co.
Arresters (Dust)
Blaw-Knox Co.
Ash & Refuse Handling Equip't.
Allen-Sherman Hoff Co.
Asphalt Mixing Plants
Hetherington & Berner, Inc.
Traylor Engineering & Mfg.
Co.
Axes
Eagle Iron Works
Backfillers
Austin-Western Road Mach.
Co.
Rucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc.
(Shovel & Crane Div.)
Link-Belt Co.
Bagging Machines
Smith, F. L., & Co.
Ball (Grinding)
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp.
(United States Steel Corp.
Subsidiary)
Jeffrey Mfg. Co.
F. L. Smith & Co.
Traylor Engineering & Mfg.
Co.
Barges
Eagle Iron Works
Batchers, Measuring Volume
Besser Mfg. Co.
Fuller Company
Jaeger Machine Co.
Stearns Mfg. Co.
Bearing Metals
Allis-Chalmers Mfg. Co.
Bearings
Eagle Iron Works
Jeffrey Mfg. Co.
Link-Belt Co.
Ryerson, Jas. T., & Sons, Inc.
Standard Pressed Steel Co.
Timken Roller Bearing Co.
**Bearings (Roller and Tapered
Roller)**
Timken Roller Bearing Co.
**Beltting (Elevator and Con-
veyor)**
Austin-Western Road Mach.
Co.
Bacon, Earle C., Co.
B. F. Goodrich Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Thermold Rubber Co.
Beltting (Transmission)
Bacon, Earle C., Co.
B. F. Goodrich Co.
Link-Belt Co.
Smith, F. L., & Co.
Thermold Rubber Co.
Beltting (V Type)
Allis-Chalmers Mfg. Co.
B. F. Goodrich Co.
Link-Belt Co.
Thermold Rubber Co.
Bin Gates
Allen-Sherman-Hoff Co.
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Besser Mfg. Co.
Fuller Co.

Geo. Haiss Mfg. Co., Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Engineering & Mfg.
Co.
Bins, Storage (Steel)
Austin-Western Road Mach.
Co.
Besser Mfg. Co.
Blaw-Knox Co.
Eagle Iron Works
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Smithid, F. L., & Co.
Traylor Engineering & Mfg.
Co.
Universal Crusher Co.
Bits (Drill)
Bucyrus-Erie Co.
Ingersoll-Rand Co.
Timken Roller Bearing Co.
Blasting Cap Protectors
B. F. Goodrich Co.
Blasting Machines and Supplies
Atlas Powder Co.
duPont, E. I., de Nemours Co.
Block Machines, Building
Anchor Concrete Machinery
Co.
Besser Mfg. Co.
Multiplex Concrete Machy Co.
Stearns Mfg. Co.
Blocks (Pillow, Roller Bearing)
Allis-Chalmers Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Standard Pressed Steel Co.
Timken Roller Bearing Co.
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Allis-Chalmers Mfg. Co.
Jeffrey Mfg. Co.
Boats (Self-Unloading)
Link-Belt Co.
Robins Conveying Belt Co.
Bodies (Dump)
Commercial Shearing &
Stamping Co.
Bodies (Dump-Truck)
Dempster Bros., Inc.
Bodies (Mixer Truck)
Blaw-Knox Co.
Jaeger Machine Co.
Smithid, F. L., & Co.
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Babcock & Wilcox Co.
Combustion Engineering Corp.
Boots
Standard Pressed Steel Co.
Boots and Shoes
B. F. Goodrich Co.
Brick Machines
Besser Mfg. Co.
Multiplex Concrete Mach. Co.
R. & L Concrete Machinery
Co.
Stearns Mfg. Co.
**Buckets (Climashell, Grab,
Orange Peel, etc.)**
Blaw-Knox Co.
Bucyrus-Erie Co.
Geo. Haiss Mfg. Co., Inc.
Harnischfeger Corp.
Hayward Company
Jaeger Machine Co.
Link-Belt Co.
Owen Bucket Co.
Robins Conveying Belt Co.
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line)**
Austin-Western Road Mach.
Co.
Besser Mfg. Co.
Blaw-Knox Co.
Bucyrus-Erie Co.
Gruendler Crusher & Pulv. Co.
Harnischfeger Corp.
Hayward Company
Hendrick Mfg. Co.
Link-Belt Co.
Owen Bucket Co.
Sauerman Bros., Inc.

Buckets (Elevator and Conveyor)
 Bacon, Earle C., Co.
 Cross Engineering Co.
 Hendrick Mfg. Co.
 Jaeger Machine Co.
 Jeffrey Mfg. Co.
 Lewistown Foundry & Mach. Co.
 Link-Belt Co.
 McLanahan & Stone Corp.
 Robins Conveying Belt Co.

Bulldozers
 Blaw-Knox Co.
 Bucyrus-Erie Co.
 Koehring Co.

Bulscrapers
 Bucyrus-Erie Co.

Burners (Klin)
 Babcock & Wilcox Co.
 Smith, F. L., & Co.

Cableways
 American Cable Co. Inc.
 American Steel & Wire Co.
 Bethlehem Steel Co.
 Blaw-Knox Co.
 Broderick & Bascom Rope Co. (Yellow Strand)
 General Electric Co.
 Leschen, A., & Sons Rope Co.
 Link-Belt Co.
 Roebling's, John A., Sons Co.
 Sauerman Bros.

Calcining Equipment
 Allis-Chalmers Mfg. Co.
 Blaw-Knox Co.
 Calcium Chloride Ass'n.
 Smith, F. L., & Co.
 Traylor Engineering & Mfg. Co.

Calcium Chloride
 Calcium Chloride Ass'n.
 Cap Crimpers and Fuse Cutter
 Ensinger-Bickford Co.

Caps (Blasting)
 Atlas Powder Co.
 duPont, E. I., de Nemours Co.

Cars
 Austin-Western Road Mach. Co.
 Besser Mfg. Co.
 Bethlehem Steel Co.
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 Link-Belt Co.
 Multiplex Concrete Mach. Co.
 Stearns Mfg. Co.
 Traylor Engineering & Mfg. Co.

Castings
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 Babcock & Wilcox Co.
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 Blaw-Knox Co.
 Chicago Steel Foundry Co.
 Dixie Machinery Mfg. Co.
 Eagle Iron Works (Grev Iron Frog, Switch & Mfg. Co.
 Jeffrey Mfg. Co.
 Lima Locomotive Works, Inc. (Shovel & Crane Div.)
 Link-Belt Co.
 McLanahan & Stone Corp.
 Robins Conveying Belt Co.
 Smith, F. L., & Co.
 Timken Roller Bearing Co.
 Traylor Engineering & Mfg. Co.

Cement Plants (Contractor)
 Allis-Chalmers Mfg. Co.
 F. L. Smith & Co.
 Traylor Engineering & Mfg. Co.

Cement Paints
 Tamms Silica Co.

Cement Process
 Cement Process Corp.

Central Mixing Plants (Concrete)
 Blaw-Knox Co.
 Chain Belt Co.
 Jaeger Machine Co.
 Chain (Dredge and Steam Shovel)
 Bucyrus-Erie Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.

Chain (Elevating and Conveying)
 Bacon, Earle C., Co.
 Gruendler Crusher & Pulv. Co.
 Jeffery Mfg. Co.
 Link-Belt Co.

Chimney Block Machines and Molds
 Besser Mfg. Co.

Chutes
 Allis-Chalmers Mfg. Co.
 Austin-Western Road Mach.
 Co.

Earl C. Bacon, Inc.
 Blaw-Knox Co.
 Cross Engineering Co.
 Eagle Iron Works
 Gruendler Crusher & Pulv. Co.
 Hendrick Mfg. Co.
 Jaeger Machine Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 McLanahan & Stone Corp.
 Robins Conveying Belt Co.
 Ross Screen & Feeder Co.
 Smidt, F. L., & Co.
 Traylor Engineering & Mfg.
 Co.

Circuit Breakers and Testers
 Allis-Chalmers Mfg. Co.
 General Electric Co.

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 Link-Belt Co.
 Nordberg Manufacturing Co.
 Raymond Pulverizer Division
 Smidt, F. L., & Co.
 Traylor Engineering & Mfg.
 Co.

Universal Crusher Co.
 Williams Patent Crusher & Pulv. Co.

Cleaning Machines (Bag)
 Link-Belt Co.
 Stearns Mfg. Co.

Clips (Wire Rope)
 Allen Cone & Machy. Corp.
 American Cable Co. Inc.
 American Steel & Wire Co.
 (United States Steel Corp.
 Subsidiary)
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 (Yellow Strand)
 Leschen, A., & Sons Rope Co.
 Roebling's, John A., Sons Co.

Clutches
 Allis-Chalmers Mfg. Co.
 Link-Belt Co.

Coal Pulverizing Equipment
 Babcock & Wilcox Co.
 Gruendler Crusher & Pulv. Co.
 Pennsylvania Crusher Co.
 Raymond Pulverizer Division
 F. L. Smidt & Co.
 Universal Crusher Co.
 Williams Patent Crusher & Pulv. Co.

Colors (Cement & Mortar)
 Geo. S. Mopham Corp.
 Tamme Silica Co.

Controllers (Electric)
 Allis-Chalmers Mfg. Co.
 General Electric Co.

Conveyors (Belt)
 Allis-Chalmers Mfg. Co.
 Austin-Western Road Mach.
 Co.

Earle C. Bacon
 Besser Mfg. Co.
 Chain Belt Co.
 Fuller Company
 Gruendler Crusher & Pulv. Co.
 Geo. Hains Mfg. Co., Inc.
 Jeffrey Mfg. Co.
 Lewistown Mfg. & Mach. Co.
 Link-Belt Co.
 McLanahan & Stone Corp.
 Multiplex Concrete Mach. Co.
 New Holland Machine Co.
 Robins Conveying Belt Co.
 F. L. Smidt & Co.
 Smith Engineering Works
 Stearns Mfg. Co.

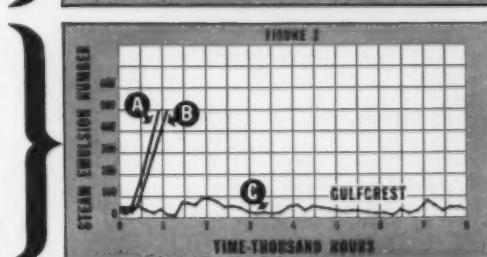
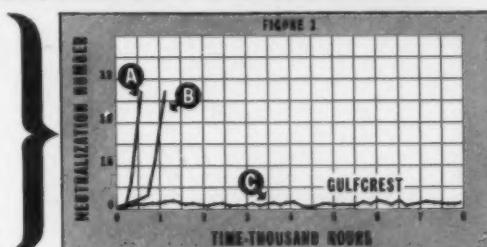


In this large turbine unit Gulfcrest Oil proves its resistance to deterioration. The Gulf engineer and plant engineer note the very slight rise in the temperature of Gulfcrest Oil after it has been circulated through the bearing.

GULFCREST OIL MAKES ALL TIME RECORDS FOR STABILITY AND RESISTANCE TO OXIDATION

Fig. 1 shows the effect of accelerated oxidation at 210° F. in the presence of copper, iron and water on the neutralization numbers of three different turbine oils. Curve C shows the marked superiority of Gulfcrest Oil. (This test was made in the laboratory of the Gulf Research & Development Company.)

Fig. 2 shows the effect of accelerated oxidation at 210° F. in the presence of copper, iron and water on the steam emulsion numbers of three different turbine oils. Curve C—representing Gulfcrest Oil—shows the marked superiority of this Alchlor treated lubricant. (This test was made in the laboratory of the Gulf Research & Development Company.)



New Standards OF TURBINE OIL QUALITY

FROM many power plants where Gulfcrest Oil is in service come reports of the remarkable performance of this turbine oil... but Gulf's research staff has not been content with the usual service tests for Gulfcrest Oil. They have devised accelerated oxidation tests at least 100 times as severe as the test of actual service.

The stability demonstrated by Gulfcrest under these grueling tests is phenomenal. Where a nominally good commercial turbine oil begins to oxidize rapidly at about 200 hours, Gulfcrest Oil shows practically no deterioration in 7200 hours of continual punishment in the testing apparatus. The results of these tests are clearly shown in the graphs at the left.

Gulf scientists have perfected in Gulfcrest Oil a turbine lubricant which multiplies by many times the service hours that can be secured by any other known oil of which we have record. The marked superiority of Gulfcrest has been so definitely established that there is practically no basis for comparison between this Alchlor processed turbine oil and others. (Gulfcrest is refined by the same exclusive process as Gulfpride—the world's finest motor oil.)

We suggest that you talk with a Gulf engineer about Gulfcrest Oil at your first opportunity.

Gulf Oil Corporation *
Gulf Refining Company

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.



Classified Directory—Continued

Sturtevant Mill Co. Traylor Engineering & Mfg. Co.
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Conveyors (Pneumatic) Fuller Company
 Gruendler Crusher & Pulv. Co.
 Raymond Pulverizer Division
Conveyors (Portable) Austin-Western Road Mach. Co.
 Fuller Company
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 Haiss, Geo., Mfg. Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 Robins Conveying Belt Co.
 Universal Crusher Co.
Conveyors (Screw) Besser Mfg. Co.
 Eagle Iron Works
 Gruendler Crusher & Pulv. Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.
Conveyors (Vibrating) Allis-Chalmers Mfg. Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 Smithth, F. L., & Co.
Coolers Allis-Chalmers Mfg. Co.
 Blaw-Knox Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 Smithth, F. L., & Co.
 Traylor Engineering & Mfg. Co.
Correcting Basins F. L. Smithth & Co.
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 Link-Belt Co.
 Robins Conveying Belt Co.
 Standard Pressed Steel Co.
Couplings (Hose, Pipe, etc.) Chicago Pneumatic Tool Co.
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 Ingersoll-Rand Co.
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 Koehring Co.
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 Northwest Engineering Co.
 Universal Crusher Co.
Cranes (Overhead Traveling Electric) Harnischfeger Corp.
Cranes (Tractor) Austin-Western Road Mach. Co.
 Bucyrus-Erie Co.
 Harnischfeger Corp.
 Koehring Company
 Lima Locomotive Works, Inc. (Shovel & Crane Div.)
 Link-Belt Co.
Cranes (Truck) Harnischfeger Corp.
Crawler Attachments Allis-Chalmers Mfg. Co.
 Harnischfeger Corp.
 Link-Belt Co.
Crusher Parts Allis-Chalmers Mfg. Co.
 American Pulverizer Co.
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 Dixie Machinery Mfg. Co.
 Eagle Iron Works
 Frog, Switch & Mfg. Co.
 Gruendler Crusher & Pulv. Co.
 Jeffrey Mfg. Co.
 Pennsylvania Crusher Co.
 Traylor Engineering & Mfg. Co.
 Universal Crusher Co.
Crushers (Jaw and Gyratory) Allis-Chalmers Mfg. Co.
 Austin-Western Road Mach. Co.
 Earle C. Bacon, Inc.
 Dixie Machinery Mfg. Co.
 Gruendler Crusher & Pulv. Co.
 Jeffrey Mfg. Co.
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New Holland Machine Co. Nordberg Mfg. Co.
Pennsylvania Crusher Co. Smith Engineering Works
 Traylor Engineering & Mfg. Co.
Universal Crusher Co. Williams Patent Crusher & Pulv. Co.
Crushers (Laboratory) Allis-Chalmers Mfg. Co.
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 Bacon, Earle C., Co.
 Dixie Machinery Mfg. Co.
 Gruendler Crusher & Pulv. Co.
 Jeffrey Mfg. Co.
 Pennsylvania Crusher Co.
 Sturtevant Mill Co.
 Traylor Engineering & Mfg. Co.
 Williams Patent Crusher & Pulv. Co.
Crushers (Ring) American Pulverizer Co.
 Dixie Machinery Mfg. Co.
 Gruendler Crusher & Pulv. Co.
 Jeffrey Mfg. Co.
 Williams Patent Crusher & Pulv. Co.
Crushers (Roll) Allis-Chalmers Mfg. Co.
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 Jeffrey Mfg. Co.
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 Eagle Iron Works
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 Jeffrey Mfg. Co.
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 Pennsylvania Crusher Co.
 Smith Engineering Works
 Traylor Engineering & Mfg. Co.
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 Bacon, Earle C., Co.
 Blaw-Knox Co.
 Dixie Machinery Mfg. Co.
 Eagle Iron Works
 Gruendler Crusher & Pulv. Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 Marion Steam Shovel Co.
 Northwest Engineering Co.
 Universal Crusher Co.
Cups (Grease) Link-Belt Co.
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Detonators Atlas Powder Co.
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Dewatering Machines Allis-Chalmers Mfg. Co.
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 Link-Belt Co.
 Morris Machine Works
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 Frog, Switch & Mfg. Co.
 Harnischfeger Corp.
 Link-Belt Co.
 Marion Steam Shovel Co.
Dirt Moving Equip. (Dumptor) Koehring Co.
Dust Moving Equip. (Dumptor) Koehring Co.
Disintegrators Smithth, F. L., & Co.
Ditchers Bucyrus-Erie Co.
 Harnischfeger Corp.
 Marion Steam Shovel Co.

Draglines Austin-Western Road Mach. Co.
 Bucyrus-Erie Co.
 Harnischfeger Corp.
 Koehring Company
 Lima Locomotive Works, Inc. (Shovel & Crane Div.)
 Link-Belt Co.
 Marion Steam Shovel Co.
 Northwest Engineering Co.
Dragline Cableway Excavators Bucyrus-Erie Co.
 Link-Belt Co.
 Marion Steam Shovel Co.
 Sauerman Bros., Inc.
Drags (Sand) Eagle Iron Works
 Jeffrey Mfg. Co.
 Smith Engineering Works
Dredges Bucyrus-Erie Co.
 Eagle Iron Works
 Hayward Co.
 Hetherington & Berner, Inc. (Complete Steel)
 Link-Belt Co.
 Marion Steam Shovel Co.
 Morris Machine Works
Dredging Sleeves B. F. Goodrich Co.
 Hetherington & Berner, Inc.
 Thermoid Rubber Co.
Drilling Accessories Bucyrus-Erie Co.
 Chicago Pneumatic Tool Co.
 Gardner-Denver Co.
 Ingersoll-Rand Co.
Drill Steel Bethlehem Steel Co.
 Chicago Pneumatic Tool Co.
 Gardner-Denver Co.
 Ingersoll-Rand Co.
Drill Sharpening Machines Bucyrus-Erie Co.
 Gardner-Denver Co.
 Ingersoll-Rand Co.
Drills (Rock) Bucyrus-Erie Co.
 Chicago Pneumatic Tool Co.
 Gardner-Denver Co.
 Ingersoll-Rand Co.
Timken Roller Bearing Co.
Drives (Belt, Chain and Rope) Allis-Chalmers Mfg. Co.
 Bacon, Earle C., Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 Smithth, F. L., & Co.
Drives (Short Center) Allis-Chalmers Mfg. Co.
 Earle C. Bacon, Inc.
 Link-Belt Co.
 Smithth, F. L., & Co.
Drives (Worm) Link-Belt Co.
Dryers Allis-Chalmers Mfg. Co.
 Babcock & Wilcox Co.
 Blaw-Knox Co.
 Combustion Engineering Corp.
 Gruendler Crusher & Pulv. Co.
 Hetherington & Berner, Inc.
 Jeffrey Mfg. Co.
 Lewistown Foundry & Mach. Co.
 Link-Belt Co.
 McLeanahan & Stone Corp.
 Raymond Pulverizer Division
 Smithth, F. L., & Co.
 Traylor Engineering & Mfg. Co.
 W. S. Tyler Co.
 Williams Patent Crusher & Pulv. Co.
Dumptors Koehring Co.
Dust Collector Stacks Blaw-Knox Co.
 Hendrick Mfg. Co.
Dust Collecting Systems Allen Sherman-Hoff Co.
 Allis-Chalmers Mfg. Co.
 Blaw-Knox Co.
 Raymond Pulverizer Division
 Smithth, F. L., & Co.
Dust Conveying Systems Fuller Company
 Allen-Sherman-Hoff Co.
Dust Handling Systems (Hydro-Vacuum) Allen-Sherman-Hoff Co.

Dynamite Atlas Powder Co.
 duPont, E. I., de Nemours Co.
Electric Cables and Wires Roebling's, John A., Sons Co.
Electrodes (Welding) American Steel & Wire Co.
 (United States Steel Corp.)
 Harnischfeger Corp.
Elevators Allen-Sherman-Hoff Co.
 Allis-Chalmers Mfg. Co.
 Austin-Western Road Mach. Co.
 Bacon, Earle C., Co.
 Besser Mfg. Co.
 Eagle Iron Works
 Fuller Company
 Gruendler Crusher & Pulv. Co.
 Haiss, Geo., Mfg. Co.
 Hendrick Mfg. Co.
 Jaeger Machine Co.
 Jeffrey Mfg. Co.
 Lewistown Foundry & Mach. Co.
 Link-Belt Co.
 McLeanahan & Stone Corp.
 Multiplex Concrete Mach. Co.
 New Holland Machine Co.
 Robins Conveying Belt Co.
 Smithth, F. L., & Co.
 Smith Engineering Works
 Stearns Mfg. Co.
 Sturtevant Mill Co.
 Traylor Engineering & Mfg. Co.
Universal Crusher Co. Williams Patent Crusher & Pulv. Co.
Emery Mills Sturtevant Mill Co.
Engines Allis-Chalmers Mfg. Co.
 Bacon, Earle C., Co.
 Blaw-Knox Co.
 Fuller Co.
 Gruendler Crusher & Pulv. Co.
 Hetherington & Berner, Inc.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 Morris Machine Works
 Productive Equipment Corp.
 Robins Conveying Belt Co.
 F. L. Smithth & Co.
 Standard Oil Company
 Sturtevant Mill Co.
 Traylor Engineering & Mfg. Co.
 Williams Patent Crusher & Pulv. Co.
Engines (Diesel, Gasoline, Kerosene and Oil) Allis-Chalmers Mfg. Co.
 Chicago Pneumatic Tool Co.
 Ingersoll-Rand Co.
 New Holland Machine Co.
 Nordberg Mfg. Co.
Engines (Steam) Allis-Chalmers Mfg. Co.
 Morris Machine Works
 Nordberg Mfg. Co.
Excavators (Cableway Dragline) American Cable Co. Inc.
 Austin-Western Road Mach. Co.
 Blaw-Knox Co.
 Bucyrus-Erie Co.
 Harnischfeger Corp.
 Koehring Company
 Lima Locomotive Works, Inc. (Shovel & Crane Div.)
 Link-Belt Co.
 Marion Steam Shovel Co.
 Northwest Engineering Co.
 Sauerman Bros., Inc.
Excavators (Clamshell) Blaw-Knox Co.
 Bucyrus-Erie Co.
 Harnischfeger Corp.
 Koehring Company
 Lima Locomotive Works, Inc. (Shovel & Crane Div.)
 Link-Belt Co.
Excavators (Crane) Austin-Western Road Mach. Co.
 Koehring Company
 Link-Belt Co.
Excavators (Tower) Bucyrus-Erie Co.
 Sauerman Bros., Inc.
Exhauster Combustion Engineering Co.
 Raymond Pulverizer Division
Explosives Atlas Powder Co.
 duPont, E. I., de Nemours Co.

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CROSS HEXSCREEN combines the accuracy of round openings and the greater capacity of square minimizing both oversize and undersize. Available in sizes from 15/16" to 4 1/4". Noted for surprisingly long wear. Always economical in the long run and often in first cost.

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**CROSS
ENGINEERING CO.
CARBONDALE, PA.**

Analyze YOUR Haulage Costs

When switching fees climb beyond a certain figure; when repairs and lessened efficiency of old locomotives becomes a cost burden—then it's time to think about the purchase of a modern locomotive that will deliver low cost ton-miles with dependable-time-saving operation.

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This book describes the best of Today's locomotives.

some significant cost leaks as the result of a careful check-up of haulage costs. That's why more and more up-to-the-minute Davenports are going into service—to deliver generous returns on dollars invested.

Classified Directory—Continued

Fans

Blaw-Knox Co.
General Electric Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Smith, F. L., & Co.

Fasteners (Belt)

Flexible Steel Lacing Co.
Robins Conveying Belt Co.

Feeders

Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co. (Pulverized Coal)

Marie C Bacon, Inc.
Besser Mfg. Co.
Blaw-Knox Co.
Fuller Co. (Cement and Pulverized Material)

Gruendler Crusher & Pulv. Co.
Hetherington & Berner, Inc.

Jeffrey Mfg. Co. (Pan & Tube)

Link-Belt Co.

Pennsylvania Crusher Co.

Robins Conveying Belt Co.

Ross Screen & Feeder Co.

Smith, F. L., & Co.

Smith Engr. Wks.

Stearns Mfg. Co.

Taylor Engineering & Mfg. Co.

Universal Crusher Co.

Fence (Wire)

American Steel & Wire Co. (United States Steel Corp. Subsidiary)

Bethlehem Steel Co.

Roebling's, John A., Sons Co.

Filter Cloth

Roebling's, John A., Sons Co.

Tyler, W. S., Co.

Filters (Air)

Fuller Company

Ingersoll-Rand Co.

Roebling's, John A., Sons Co.

Floor Sweeping Systems (Hydro Vacuum)

Allen-Sherman Hoff Co.

Forges (Oil)

Gardner-Denver Co.

Forgings

Allis-Chalmers Mfg. Co.

Bacon, Earle C., Co.

Forms, Concrete (Ornamental)

Besser Mfg. Co.

Fuels (Diesel)

Texas Co.

Furnaces

Combustion Engineering Corp.

Fuses

General Electric Co.

Fuses (Detonating and Safety)

Ensign-Bickford Co.

Gaskets

B. F. Goodrich Co.

Gasoline

Gulf Refining Co.

Standard Oil Company

Texas Company

Gear Reducers

Link-Belt Co.

Gears

Allis-Chalmers Mfg. Co.

Bacon, Earle C., Co.

Frog, Switch & Mfg. Co.

General Electric Co.

Jeffrey Mfg. Co.

Link-Belt Co.

Robins Conveying Belt Co.

Taylor Engineering & Mfg. Co.

Generators (Electric)

Allis-Chalmers Mfg. Co.

General Electric Co.

Harnischfeger Corp.

Ingersoll-Rand Co.

Nordberg Mfg. Co.

Grapplers

Blaw-Knox Co.

Bucyrus-Erle Co.

Hayward Co.

Owen Bucket Co.

Grease

Bacon, Earle C., Co.

Gulf Refining Co.

Standard Oil Company

Texas Company

Guards (Machinery)

Harrington & King Perforating Co.

Tyler, W. S., Co.

Guns (Hydraulic)

Morris Machine Works

Haulage Systems (Electric)

General Electric Co.

Jeffrey Mfg. Co.

Heat Treating Machines (Drill Steel)

Ingersoll-Rand Co.

Hoists

Allis-Chalmers Mfg. Co.

Besser Mfg. Co.

Chicago Pneumatic Tool Co.

Commercial Shearing & Stamping Co.

Eagle Iron Works

Gardner-Denver Co.

Gruendler Crusher & Pulv. Co.

Harnischfeger Corp.

Ingersoll-Rand Co.

Jaeger Machine Co.

Jeffrey Mfg. Co.

Link-Belt Co.

McLanahan & Stone Corp.

Nordberg Mfg. Co.

Northwest Engineering Co.

Robins Conveying Belt Co.

Sauerman Bros., Inc.

Stearns Mfg. Co.

Taylor Engineering & Mfg. Co.

Hooks (Wire Rope)

American Cable Co. Inc.

American Steel & Wire Co.

(United States Steel Corp. Subsidiary)

Leschen, A., & Sons Rope Co.

Roebling's, John A., Sons Co.

Hoppers

Austin-Western Road Mach. Co.

Besser Mfg. Co.

Blaw-Knox Co.

Gruendler Crusher & Pulv. Co.

Hendrick Mfg. Co.

Jaeger Machine Co.

Jeffrey Mfg. Co.

Link-Belt Co.

Robins Conveying Belt Co.

Taylor Engineering & Mfg. Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Auction and Discharge)

Chicago Pneumatic Tool Co.

B. F. Goodrich Co.

Dixie Machinery Mfg. Co.

Ingersoll-Rand Co.

Jaeger Machine Co.

Morris Machine Works

Thermoid Rubber Co.

Hulls (Dredge)

Eagle Iron Works

Hydrators

Blaw-Knox Co.

Idlers (Conveyors)

Austin-Western Road Mach. Co.

Bacon, Earle C., Co.

Gruendler Crusher & Pulv. Co.

Jeffrey Mfg. Co.

Link-Belt Co.

Robins Conveying Belt Co.

Smith, F. L., & Co.

Indicators (Bin)

Fuller Company

Insulation (Electric)

General Electric Co.

Insulators, Vibration (Rubber)

Goodrich, B. F., Co.

Jigs (Sand and Gravel)

Allis-Chalmers Mfg. Co.

Taylor Engineering & Mfg. Co.

Kilns Parts

Allis-Chalmers Mfg. Co.

Blaw-Knox Co.

Chicago Steel Foundry Co.

Smith, F. L., & Co.

Taylor Engineering & Mfg. Co.

Kilns (Rotary)

Allis-Chalmers Mfg. Co.

Blaw-Knox Co.

F. L. Smith & Co.

Taylor Engineering & Mfg. Co.

Ladders (Dredge)

Eagle Iron Works

Lighters (Fuse)

Ensign-Bickford Co.

Line Plants

Allis-Chalmers Mfg. Co.

American Pulverizer Co.

Blaw-Knox Co.

Gruendler Crusher & Pulv. Co.

Smith, F. L., & Co.

Taylor Engineering & Mfg. Co.

Classified Directory—Continued

Liners (Chute)
 Bacon, Earle C., Co.
 Cross Engineering Co.
 Goodrich, B. F., Co.
 McLanahan & Stone Corp.
Liners, Metal (Kiln)
 Taylor Engineering & Mfg. Co.
Liners (Mill)
 Allis-Chalmers Mfg. Co.
 Babcock & Wilcox Co.
 Carnegie-Illinois Steel Corp.
 (United States Steel Corp. Subsidiary)
 Goodrich, B. F., Co.
 Jeffrey Mfg. Co.
 Smith, F. L., & Co.
 Taylor Engineering & Mfg. Co.
Lime Handling Equipment
 Fuller Company
 Link-Belt Co.
 Raymond Pulverizer Division
Loaders
 Besser Mfg. Co.
 Bucyrus-Erie Co.
 Fuller Company
 Gardner-Denver Co.
 Gruendler Crusher & Pulv. Co.
 Gen. Hales Mfg. Co., Inc.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 Marion Steam Shovel Co.
 New Holland Machine Co.
 Northwest Engineering Co.
 Robins Conveying Belt
 Ross Screen & Feeder Co.
 Stearns Mfg. Co.
Loaders (Boat)
 Link-Belt Co.
Loaders (Box Car)
 Gruendler Crusher & Pulv. Co.
 Jeffrey Mfg. Co.
 Link-Belt Co.
Loaders (Underground)
 Jeffrey Mfg. Co.
 Nordberg Mfg. Co.
Locomotives (Diesel and Diesel-Electric)
 Davenport-Besler Corp.
 Ingersoll-Rand Co.
Locomotives (Electric)
 Davenport-Besler Corp.
 General Electric Co.
 Jeffrey Mfg. Co.
Locomotives (Gasoline)
 Davenport-Besler Corp.
Locomotives (Gas-Electric)
 Davenport-Besler Corp.
 Jeffrey Mfg. Co.
Locomotives (Oil-Electric)
 General Electric Co.
 Ingersoll-Rand Co.
Locomotives (Storage Battery)
 General Electric Co.
 Jeffrey Mfg. Co.
Lubricants
 Bacon, Earle C., Co.
 Chicago Pneumatic Tool Co.
 Gulf Refining
 Robins Conveying Belt Co.
 Standard Oil Company
 Texas Company
Lubricants (Wire Rope)
 American Steel & Wire Co.
 (United States Steel Corp. Subsidiary)
 Broderick & Bascom Rope Co.
 (Yellow Strand)
 Roebling's, John A., Sons Co.
 Texas Co.
Magnets
 General Electric Co.
Material Handling Equipment
 Allen-Sherman-Hoff Co.
 Austin-Western Road Mach. Co.
 Fuller Company
 Gruendler Crusher & Pulv. Co.
 Harnischfeger Corp.
 Jeffrey Mfg. Co.
 Link-Belt Co.
 Raymond Pulverizer Division
 Robins Conveying Belt Co.
Measuring Devices
 Blaw-Knox Co.
 General Electric Co.
Mechanical Rubber Goods
 B. F. Goodrich
 Thermoid Rubber Co.
Mill Parts
 Allis-Chalmers Mfg. Co.
 Blaw-Knox Co.
 Gruendler Crusher & Pulv. Co.
 Smith, F. L., & Co.

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Universally acclaimed the most practical piece of equipment ever devised for moving any material that is loaded by hand.

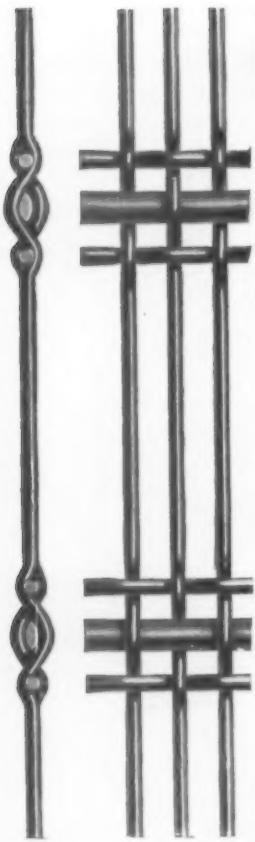
These **DETACHABLE CONTAINERS** are approximately 28 inches high, making loading exceedingly easy and enables laborers to load twice as much as with conventional type dump bodies. The hoisting device which raises, carries and dumps these buckets can easily be installed on your present trucks.

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made to work under tension and vibration.

The straight stay-bars carry ALL the tension. The crimps in the round wires can not be stretched or broken. The screen can not be caused to sag or split by the pull of the tensioning device.

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Front view showing
breaker plate adjustment.



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becomes an easy matter when you install an AMERICAN.

It is designed and built for long, trouble-free service. Every part has been tested for quality, wear and endurance to assure absolute satisfaction in actual service.

AMERICAN CRUSHERS can withstand terrific punishment and stay right on the job delivering more tonnage per hour and producing a better product.

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AMERICAN PULVERIZER CO.
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Classified Directory—Continued

Jeffrey Mfg. Co.
Robins Conveying Belt Co.

Pulleys
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizer Parts
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Dixie Machinery Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Smithth, F. L., & Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.

American Pulverizer Co.
Babcock & Wilcox Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.

Jeffrey Mfg. Co.
Lewistown Foundry & Mach. Co.

New Holland Machine Co.
Pennsylvania Crusher Co.

Raymond Pulverizer Division
F. L. Smithth & Co.
Sturtevant Mill Co.

Traylor Engineering & Mfg. Co.

Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Centrifugal)

Allen Cone & Machy. Corp.
Allen-Sherman Hoff Co.

Allis-Chalmers Mfg. Co.
Gardner-Denver Co.

Hetherington & Berner, Inc.

Ingersoll-Rand Co.

Jaeger Machine Co.

Morris Machine Works

Smithth, F. L., & Co.

Pumps (Pulverized Material)

Babcock & Wilcox Co.

Fuller Company

Ingersoll-Rand Co.

Morris Machine Works

Smithth, F. L., & Co.

Pumps (Sand and Gravel)

Allen-Sherman Hoff Co.

Allis-Chalmers Mfg. Co.

Bucyrus-Erie Co.

Hetherington & Berner, Inc.

Ingersoll-Rand Co.

Jaeger Machine Co.

Morris Machine Works

A. R. Willfley & Sons

Pumps (Slurry)

Allen-Sherman Hoff Co.

Allis-Chalmers Mfg. Co.

Ingersoll-Rand Co.

Morris Machine Works

F. L. Smithth & Co.

A. R. Willfley & Sons

Pumps (Vacuum)

Allis-Chalmers Mfg. Co.

Chicago Pneumatic Tool Co.

Fuller Company

Ingersoll-Rand Co.

Smithth, F. L., & Co.

Racks (Curing)

Besser Mfg. Co.

Multiplex Concrete Mach. Co.

Stearns Mfg. Co.

Racks (Lift Truck)

Besser Mfg. Co.

Rails

Bethlehem Steel Co.

Railways (Electric)

General Electric Co.

Rectifiers

Allis-Chalmers Mfg. Co.

General Electric Co.

Recuperators

Traylor Engineering & Mfg. Co.

Refractories

Smithth, F. L., & Co.

Regulators, Mixer (Asphalt)

Hetherington & Berner, Inc.

Regulators (Voltage)

Allis-Chalmers Mfg. Co.

General Electric Co.

Rewashers (Screw)

Link-Belt Co.

Smith Engineering Works

Rods (Welding)

American Steel & Wire Co.

(United States Steel Corp. Subsidiary)

Roebling's, John A., Sons Co.
Ryerson, Jos. T., & Sons, Inc.

Rolls (Crushing)
Allis-Chalmers Mfg. Co.
Austin-Western Road Mach. Co.

Babcock & Wilcox Co.
Bacon, Earle C., Co.

Eagle Iron Works

Gruendler Crusher & Pulv. Co.

Jeffrey Mfg. Co.

Link-Belt Co.

McLanahan & Stone Corp.

New Holland Machine Co.

Pennsylvania Crusher Co.

Sturtevant Mill Co.

Traylor Engineering & Mfg. Co.

Universal Crusher Co.

Williams Patent Crusher & Pulv. Co.

Rolls (Conveyor)

Bacon, Earle C., Co.

Jeffrey Mfg. Co.

Link-Belt Co.

Robins Conveying Belt Co.

Rolls (Rubber Covered)

Goodrich, B. F., Co.

Sand and Gravel Plants

Allis-Chalmers Mfg. Co.

Austin-Western Road Mach. Co.

Bacon, Earle C., Co.

Eagle Iron Works

Gruendler Crusher & Pulv. Co.

Jeffrey Mfg. Co.

Link-Belt Co.

Robins Conveying Belt Co.

Traylor Engineering & Mfg. Co.

Sand Lime Brick Machinery

Jeffrey Mfg. Co.

Scales (Hopper)

Blaw-Knox Co.

Scrapers (Power Drag)

Austin-Western Road Mach. Co.

Blaw-Knox Co.

Bucyrus-Erie Co.

Harnischfeger Corp.

Hayward Company

Jeffrey Mfg. Co.

Link-Belt Co.

Northwest Engineering Co.

Sauerman Bros., Inc.

Screen Parts

Allis-Chalmers Mfg. Co.

Bacon, Earle C., Co.

Gruendler Crusher & Pulv. Co.

Hendrick Mfg. Co.

Traylor Engineering & Mfg. Co.

Screens

Allis-Chalmers Mfg. Co.

Austin-Western Road Mach. Co.

C. Bacon, Inc.

Besser Mfg. Co.

Carnegie-Illinois Steel Corp.

(United States Steel Corp. Subsidiary)

Chicago Perforating Co.

Cleveland Wire Cloth & Mfg. Co.

Cross Engineering Co.

Eagle Iron Works

Frog, Switch & Mfg. Co.

Gruendler Crusher & Pulv. Co.

Geo. Hains Mfg. Co., Inc.

Harrington & King Perf. Co.

Hendrick Mfg. Co.

Jeffrey Mfg. Co.

Lewistown Foundry & Mach. Co.

Link-Belt Co.

Ludlow-Saylor Wire Co.

New Holland Machine Co.

Nordberg Mfg. Co.

Productive Equipment Corp.

Robins Conveying Belt Co.

Roebling's, John A., Sons Co.

Ross Screen & Feeder Co.

Screen Equipment Co.

Simplicity Engineering Co.

Smith Engineering Works

Sturtevant Mill Co.

Traylor Engineering & Mfg. Co.

Tyler, W. S., Co.

Universal Crusher Co.

Universal Vib. Screen Co.

Williams Patent Crusher & Pulv. Co.

Screens (Grizzly)

Allis-Chalmers Mfg. Co.

Austin-Western Road Mach. Co.

Eagle Iron Works

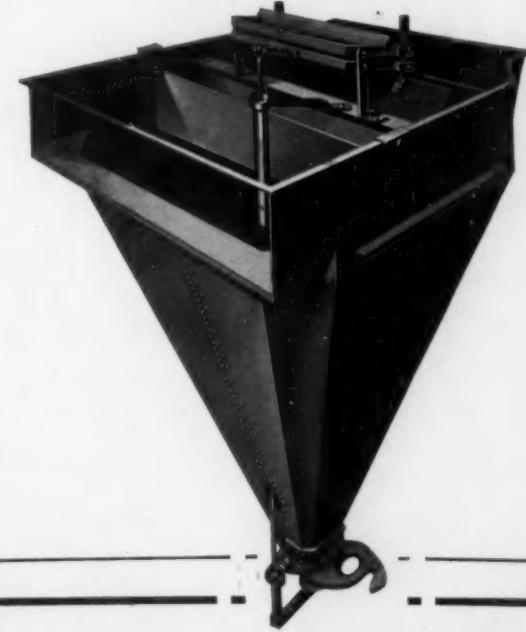
Classified Directory—Continued

Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Lewistown Foundry & Mach.
Co.
Link-Belt Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Roebling's, John A., Sons Co.
Ross Screen & Feeder Co.
Smith Engineering Works
Taylor, Engineering & Mfg.
Co.
Tyler, W. S., Co.
Universal Vibrating Screen
Co.
Screens (Laboratory)
Allis-Chalmers Mfg. Co.
Gruendler Crusher & Pulv. Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Roebling's, John A., Sons Co.
Smith, F. L., & Co.
Tyler, W. S., Co.
Williams Patent Crusher &
Pulv. Co.
Screens, Scalping
Allis-Chalmers Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Smith Engineering Works
Williams Patent Crusher &
Pulv. Co.
Screens (Vibrating)
Allen Cone & Machy. Corp.
Allis-Chalmers Mfg. Co.
Austin-Western Road Mach.
Co.
Bacon, Earle C., Co.
Eagle Iron Works
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Nordberg Mfg. Co.
Robins Conveying Belt Co.
Screen Equipment Co.
Simplicity Engineering Co.
Smith Engineering Works
Sturtevant Mill Co.
W. S. Tyler Co.
Universal Crusher Co.
Universal Vib. Screen Co.
Williams Patent Crusher &
Pulv. Co.
**Screws (Cap, Self Locking, Set,
Hollow Set)**
Standard Pressed Steel Co.
Scrubbers, Washers
Allis-Chalmers Mfg. Co.
Austin-Western Road Mach.
Co.
Earle C. Bacon, Inc.
Eagle Iron Works
Gruendler Crusher & Pulv. Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Robins Conveying Belt Co.
Roebling's, John A., Sons Co.
Smith Engineering Works
Taylor Engineering & Mfg.
Co.
Tyler, W. S., Co.
Universal Vibrating Screen
Co.
Seal Rings
Taylor Engineering & Mfg.
Co.
Separators (Air)
Blaw-Knox Co.
Combustion Engr. Co.
Link-Belt Co.
Raymond Pulverizer Division
Smith, F. L., & Co.
Sturtevant Mill Co.
Williams Patent Crusher &
Pulv. Co.
Separators (Slurry)
F. L. Smith & Co.
Sheaves
Allis-Chalmers Mfg. Co.
American Steel & Wire Co.
(United States Steel Corp.
Subsidiary)
Eagle Iron Works
Jeffrey Mfg. Co.
Link-Belt Co.
Roebling's, John A., Sons Co.
Shovels (Compressed Air)
Nordberg Mfg. Co.
Shovels (Tractor)
Austin-Western Road Mach.
Co.
Harnischfeger Corp.
Koehring Company
Lima Locomotive Works, Inc.
(Shovel & Crane Div.)
Link-Belt Co.
**Shovels, Power (Steam, Gas,
Electric, Diesel, Oil)**
Austin-Western Road Mach.
Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Co.
Lima Locomotive Works, Inc.
(Shovel & Crane Div.)
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
(Crawling Tractor)
Sieves (Testing)
Hendrick Mfg. Co.
Roebling's, John A., Sons Co.
Smith, F. L., & Co.
Tyler, W. S., Co.
Silos
Blaw-Knox Co.
F. L. Smith & Co.
Silo Stave Machines (Concrete)
Besser Mfg. Co.
Skips (Hoist)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Taylor Engineering & Mfg.
Co.
Slakers (Rotary)
Taylor Engineering & Mfg.
Co.
Slings (Wire Rope)
American Cable Co., Inc.
American Steel & Wire Co.
(United States Steel Corp.
Subsidiary)
Bethlehem Steel Co.
Broderick & Mascom Rope
Co. (Yellow Strand)
A. Leschen & Sons Rope Co.
Roebling's, John A., Sons Co.
Slugs (Grinding)
Smith, F. L., & Co.
Smokestacks
Hendrick Mfg. Co.
Taylor Engineering & Mfg.
Co.
Sockets (Wire Rope)
American Cable Co., Inc.
American Steel & Wire Co.
(United States Steel Corp.
Subsidiary)
Leschen, A., & Sons Rope Co.
Roebling's, John A., Sons Co.
Speed Reducers
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Smith, F. L., & Co.
Taylor Engineering & Mfg.
Co.
Spouts
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Taylor Engineering & Mfg.
Co.
Sprockets
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Standpipes
Ross Screen & Feeder Co.
Starters (Motor)
Allis-Chalmers Mfg. Co.
General Electric Co.
Steel, Abrasion Resisting
Joseph T. Ryerson & Son, Inc.
Steel (Electric Furnace)
Chicago Steel Foundry Co.
Timken Roller Bearing Co.
Steel (Open Hearth)
Timken Roller Bearing Co.
Steel (Special Alloy)
Chicago Steel Foundry Co.
Timken Roller Bearing Co.
Steel (Special Analysis)
Timken Roller Bearing Co.
Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.
Link-Belt Co.
Storage Equipment
Blaw-Knox Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Sauerman Bros., Inc.

4

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Offer a wide range of application in the sand and gravel industry—by using two or more ALLEN CONES or TANKS in series a number of products can be made from materials that are now being wasted or sold as a single product.

They produce a clean product for concrete, asphalt, brick, plaster and foundry uses. Complete elimination of clay, loam and silt is assured. AND IN ADDITION every ALLEN Sand Tank is featured by rapid adjustment to meet changing specifications, automatic operation, freedom from attention, large capacity, drier product, no power requirements and long life.

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NO. 9443 TY-ROD NO. 9424 TY-ROD

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Manufacturers of
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Durand, Mich.

Classified Directory—Continued

- Strands (Wire)**
American Steel & Wire Co.
(United States Steel Corp.
Subsidiary)
Roebling's, John A., Sons Co.
- Switchboards**
Allis-Chalmers Mfg. Co.
General Electric Co.
- Tampers (Power)**
Besser Mfg. Co.
Multiplex Concrete Machy Co.
Stearns Mfg. Co.
- Tanks**
Allen Cone & Machy. Corp.
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Combustion Engineering Corp.
Eagle Iron Works
Hendrick Mfg. Co.
Ingersoll-Rand Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Raymond Pulverizer Division
Traylor Engineering & Mfg. Co.
- Tanks (Sand Settling)**
Allen Cone & Mach. Corp.
Eagle Iron Works
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Smith Engineering Works
- Thickeners**
Smithid, F. L., & Co.
- Ties (Bag)**
American Steel & Wire Co.
(United States Steel Corp.
Subsidiary)
- Tile Machines**
Besser Mfg. Co.
Flam, Stephan
Multiplex Concrete Mach. Co.
R & L Concrete Machinery Co.
- Tires and Tubes**
B. F. Goodrich Co.
- Towers**
Blaw-Knox Co.
Eagle Iron Works
Hendrick Mfg. Co.
Jaeger Machine Co.
Robins Conveying Belt Co.
Sauerman Bros., Inc.
- Track Equipment**
Besser Mfg. Co.
Carnegie-Illinois Steel Corp.
(United States Steel Corp.
Subsidiary)
Nordberg Mfg. Co.
- Track Shifters**
Nordberg Mfg. Co.
- Track Systems (Overhead)**
Jeffrey Mfg. Co.
Link-Belt Co.
- Tractors**
Allis-Chalmers Mfg. Co.
Koehring Co.
- Trailers**
Allis-Chalmers Mfg. Co.
Austin-Western Road Mach. Co.
Gar Wood Industries, Inc.
Koehring Company
- Tramways (Aerial Wire Rope)**
American Cable Co. Inc.
American Steel & Wire Co.
(United States Steel Corp.
Subsidiary)
Bethlehem Steel Co.
Broderick & Bascom Rope Co.
(Yellow Strand)
A. Leschen & Sons Rope Co.
Roebling's, John A., Sons Co.
- Transformers**
Allis-Chalmers Mfg. Co.
General Electric Co.
- Transmission Machinery**
Allis-Chalmers Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Standard Pressed Steel Co.
Timken Roller Bearing Co.
- Transmissions (Variable Speed)**
Allis-Chalmers Mfg. Co.
Link-Belt Co.
- Trippers (Belt)**
Bacon, Earle C., Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
- Trolleys (I-Beam)**
Harnischfeger Corp.
- Troughs**
Cross Engineering Co.
- Trucks (Dump)**
Gar Wood Industries, Inc.
- Trucks (Hand)**
Standard Pressed Steel Co.
- Trucks (Lift)**
Besser Mfg. Co.
Flam, Stephan
Stearns Mfg. Co.
- Trucks (Mixers)**
Blaw-Knox Co.
Jaeger Machine Co.
- Tubing (Blasting)**
B. F. Goodrich Co.
- Tubing (Seamless Steel)**
Timken Roller Bearing Co.
- Turbines**
Allis-Chalmers Mfg. Co.
General Electric Co.
- Unloaders**
Bucyrus-Erie Co.
Fuller Company
Gruendler Crusher & Pulv. Co.
Haisas, Geo., Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Marion Steam Shovel Co.
New Holland Machine Co.
Northwest Engineering Co.
Robins Conveying Belt Co.
- Unloaders (Box Car)**
Besser Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Stearns Mfg. Co.
- Unloaders (Pneumatic)**
Fuller Company
- Valves (Pulverized Material)**
Fuller Company
- Valves (Pump)**
B. F. Goodrich Co.
- Valves (Slurry)**
Fuller Company
Wilfley, A. R., & Sons, Inc.
- Vibrators**
Ingersoll-Rand Co.
Link-Belt Co.
Stearns Mfg. Co.
W. S. Tyler Co.
- Wagons (Dump)**
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Blaw-Knox Co.
- Washers (Log)**
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Jeffrey Mfg. Co.
Link-Belt Co.
- Washers (Sand, Gravel and Stone)**
Allen Cone & Mach. Corp.
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
- Bacon, Earle C., Co.**
Eagle Iron Works
Gruendler Crusher & Pulv. Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Lewistown Foundry & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Roebling's, John A., Sons Co.
Smith Engineering Wks.
Tyler, W. S., Co.
Traylor Engr. & Mfg. Co.
Universal Crusher Co.
Universal Vibrating Screen Co.
- Waterproofing**
Tamma Silica Co.
- Weighing Equipment**
Blaw-Knox Co.
Fuller Company
- Welding and Cutting Apparatus**
General Electric Co.
Harnischfeger Corp.
- Wheels (Car)**
Bethlehem Steel Co.
Eagle Iron Works
Link-Belt Co.
- Wheels (Crane)**
Harnischfeger Corp.
- Wheels (Sprocket)**
Link-Belt Co.
- Winches**
Ingersoll-Rand Co.
Link-Belt Co.
Robins Conveying Belt Co.
- Wire Cloth**
American Steel & Wire Co.
(United States Steel Corp.
Subsidiary)
Bacon, Earle C., Co.

ROCK PRODUCTS

Classified Directory—Continued

Cleveland Wire Cloth & Mfg. Co.

Eagle Iron Works
Leschen, A., & Sons Rope Co.
Link-Belt Co.
Ludlow-Saylor Wire Co.

Inc.

Robins Conveying Belt Co.
Roebling's, John A., Sons Co.

Screen Equipment Co.
Tyler, W. S., Co.

Universal Vibrating Screen Co.

Wire (Copper, Iron and Steel)
American Steel & Wire Co.
(United States Steel Corp. Subsidiary)

General Electric Co.
Roebling's, John A., Sons Co.

Wire Rope
American Cable Co., Inc.
American Steel & Wire Co.
(United States Steel Corp. Subsidiary)

Bethlehem Steel Co.
Broderick & Bascom Rope Co.
(Yellow Strand)

A. Leschen & Sons Rope Co.
Roebling's, John A., Sons Co.

Wire Rope Fittings
American Cable Co.

American Steel & Wire Co.
(United States Steel Corp. Subsidiary)

Bethlehem Steel Co.

Broderick & Bascom Rope Co.

(Yellow Strand)

A. Leschen & Sons Rope Co.
Roebling's, John A., Sons Co.

Wire (Welding)

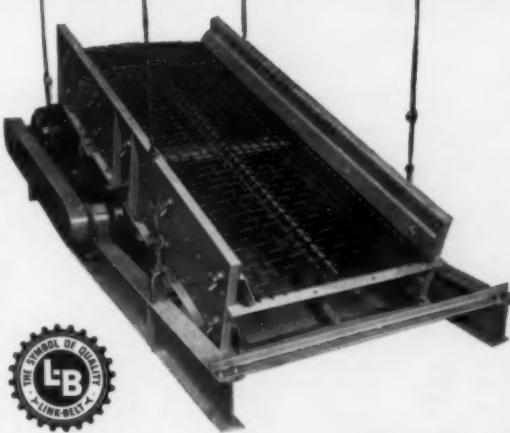
American Steel & Wire Co.
(United States Steel Corp. Subsidiary)

Roebling's, John A., Sons Co.

Wrenches (Car)

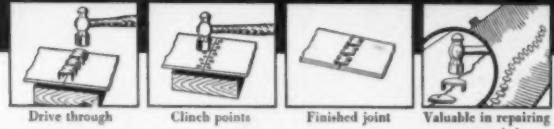
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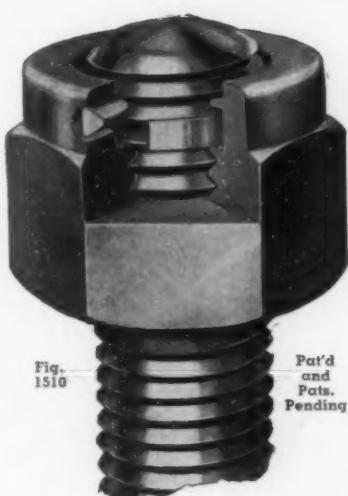
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"Unshako" is different in principle . . . a built-in ring locks the nut on the bolt or stud. Once it has been tightened up the "Unshako" stays there. No ifs, no buts . . . you can depend upon its staying put until you want to release it . . . then it only takes the help of an ordinary wrench and off it comes with no trouble at all.

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1—Farrel
Also 1—42" x 60" Farrel

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1—5' x 60' Traylor Eng.
2—5' x 30', 80" x 40' Ruggles-Coles.
1—6' x 40' Bonnot.

1—5-roll Raymond High Side Pulverizer, also all sizes Raymond beater types and Imp mills. Also other makes and sizes.

1—600 CFM Air Compressor, I-R., with 100 H.P., 3/60/440 volt motor.

3—Single Roll Crushers; 18x16" Pennsylvania, 18x24" McLanahan, 24x24" Link-Belt.

5—Centrifugal Air Separators; 14', 8', 30' Gayco; 10' Sturtevant.

3—42" x 16" Allis-Chalmers Type "B" Crushing Rolls.

2—3' x 8' Niagara and 4' x 8' Allis-Chalmers Vib. Screens, 2-deck, motor driven.

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JAW TYPE: Traylor 8x16, 60x18, 20x60 & 24x72,
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P&M 24x72, Good 24x72, 10x50 & 10x40. Bakstad
3-jaw 8x20, Min. 9x16, 8x26, 15x36, Etc.

REDUC. TYPE: 6, 10 & 18" Super McCulley. 2', 3'
& 4' Symon Cone. 7" Newhouse, etc.

ROLLS: Allis-C. 26x16, 40x15 & 54x24. Jeff. 30x30.

HAMMERMILLS: Williams Nos. 2, 4, 5 & 8. Others.

MILLS: Kennedy Ball 4x6, 5x6 & 5x8. Kent 34x7".

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14 Ton Porter 36" gauge, four wheel saddle tank locomotive, 9x14" cylinders, built 1923, A.S.M.E. boiler.

21 Ton Vulcan 36" gauge, four wheel saddle tank locomotive, 11x16" cylinders, built 1923, National Board Boiler.

30 Ton Vulcan, 36" gauge four wheel saddle tank locomotive, 13x18" cylinders, built 1922, A.S.M.E. boiler.

50 Ton American four wheel saddle tank locomotive, 16x24" cylinders, A.S.M.E. boiler.

53 Ton Baldwin six wheel switching locomotive with separate tender, 18x24" cylinders, A.S.M.E. boiler.

50 Ton Baldwin six wheel switching locomotive with separate tender, 17x24" cylinders, A.S.M.E. boiler.

30 Ton Plymouth four wheel gasoline locomotive.

12 Ton Whitcomb four wheel gasoline locomotive.

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Birmingham, Alabama

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4—Allen Sand Settling Tanks 4'0", 5'0", 6'0", 1000 Tons Cap.

1—200 H.P. G.E. Slip Ring Motor, 600 R.P.M., 440 Volts, 50% Resistance Controller, Magnetic Switch.

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1—Hall-Scott Gas. Eng., 180 B.H.P.

6—Hoists, 2 drum & swinger, 37 1/2 H.P. elec.

30—Compressors, 360'-1500', steam & elec. drives.

20—Pumps, 2"-12", steam, elec. & gas drives.

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SPECIAL! 100 ALL-STEEL 50-TON BATTLESHIP HOPPER CARS

25—40 ton steel u/f flats.
20—30 ton steel u/f flats.
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200—30 ton steel u/f box cars.
75—30 ton steel u/f stock cars.
75—50 ton all-steel gons.

15—30 ft. all steel gons. New 1926

Narrow Gauge Dump Cars and Locomotives Standard Gauge Dump Cars and Switch Engines

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1—15-20 ton Link-Belt, 50 ft. boom.
1—20 ton Browning No. 8, 50 ft. boom.
1—30 ton Ohio, 50 ft. boom.
1—40 ton Brownhoist, 50 ft. boom.

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1—32 ton American, Std. Ga.
1—40 ton Baldwin, Std. Ga.
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4—50 ton 6-wheel tender type engines,
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care to give service
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FEBRUARY, 1938

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Portable and stationary, belt with elec. or gas power, sizes from 21 cu. ft. to 1,000 cu. ft.

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3—3 compartment with scales, 10,000 lbs. cap.; 1—230 ton Butler, type X; 1—150 ton Blaw Knox; 1—112 ton Butler.

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35—Williams, Blaw Knox & Owen clamshell sizes & types.

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2—Browning 25 ton cranes, ser. Nos. 1854 & 2660, 8 wheel, std. ga., 50' boom.

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1—Link-Belt K-55, ser. No. 1698, 70' boom, 2 yd. bucket, also have 2 yd. shovel attachment.

2—Northwest, model 104, ser. nos. 2079 & 1597, 45' boom, 1½ yd. bucket; one with 1 yd. shovel attachment.

1—Link Belt mod. K-42, ser. No. 1265, 45' boom, 1½ yd. bucket; also have 1 yd. trench hoe attachment.

2—Link Belt mod. K-42, ser. No. 1222 & 1171, 40' boom, 1½ yd. bucket; also with 1 yd. trench hoe attachment.

1—Northwest mod. 105, ser. No. 2053, 40' boom, 1 yd. bucket.

1—American Gopher No. GS-184, 50' boom, 1 yd. bucket.

1—Link Belt mod. K-1, ser. No. 1024, 50' boom, 1 yd. bucket.

1—Osgood Heavy Duty, ser. No. 2059, 40' boom, 1 yd. bucket & with 1 yd. shovel attachment.

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1—Brownhoist No. 1, ser. No. 10657.

1—Byers Bearcat mod. 27, ser. No. 5280, 30' boom, ½ circle swing, ½ yd. bucket.

1—Erie type B-2, ser. No. 4122, steam crane, 40' boom, 1 yd. bucket.

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4—Gyratory: 1—Allis Chalmers size No. 6, style N; 1—Allis Chalmers Gates No. 5; 2—McCuller No. 3.

3—Jaw Crushers: 1—1½" Champion No. 6; 1—10x20" Climax No. 2½;

1—9x16" Telsmith No. 9-A.

1—American Gopher No. GS-184, 50' boom, 1 yd. bucket.

1—Link Belt mod. K-1, ser. No. 1024, 50' boom, 1 yd. bucket.

1—Osgood Heavy Duty, ser. No. 2059, 40' boom, 1 yd. bucket & with 1 yd. shovel attachment.

4—Steel stiff leg: 1—15 ton Dobbins, 180' boom; 1—15 ton Clyde, 50' boom; 1—15 ton Clyde "A" frame

DRILLS

DRILLS

barge derrick, 50' boom; 1—10 ton Inslay, 80' boom.

DRILLS

6—Wagon drills, Ingersoll Rand & Gardner Denver, with IRX71 & GD17 and 21 drills.

LOADERS

3—Bucket loaders: 2—Barber Greene (1—mod. 42-B, No. 42-12-59; 1—mod. 42-A, No. 23451); 1—Hais No. C-7042.

PUMPS

5—Dredge pumps: 1—10" Morris manganese; 1—8" Cataract No. 175885; 1—8" Morris; 1—6" Erie; 1—6" Fairbanks Morse Woods trash pump.

TRACTORS

3—Allis Chalmers mod. "L" tractors, Nos. 682, 1670 & 1691, with Baker hydraulic bulldozers.

4—Caterpillar: 1—mod. 65, ser. No. 2-D-201; 2—mod. 60, ser. Nos. 5842 & 5874; 1—mod. 30, ser. No. 7969.

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1—Mod. 75 Wiley Whirley No. 2973, 20 tons cap., 75' boom, SD Clyde, 80 HP, elec. hoist & 30 HP elec. swinger, all complete. Perfect condition.

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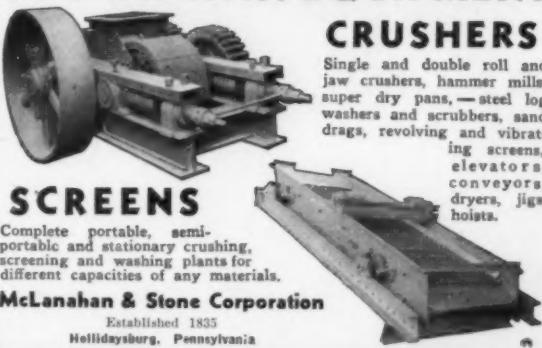
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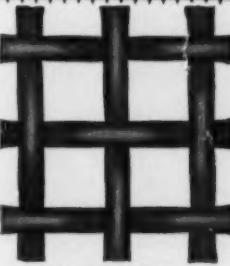
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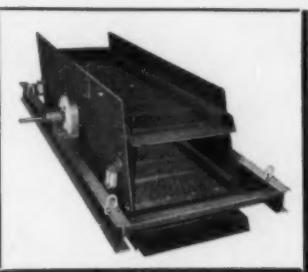


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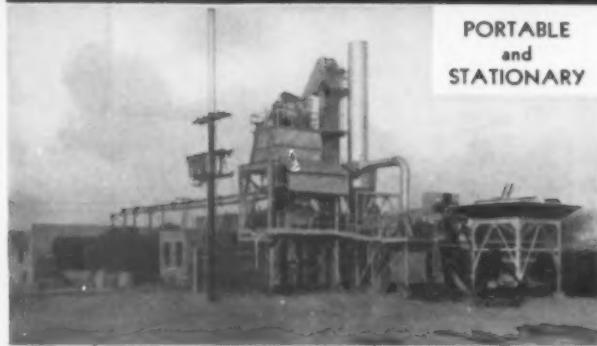


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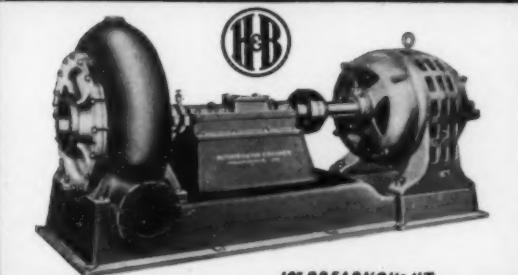
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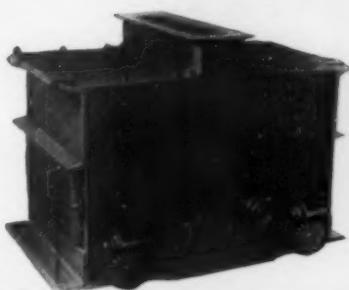


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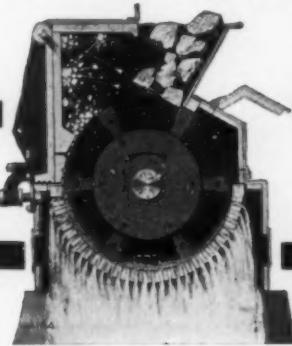
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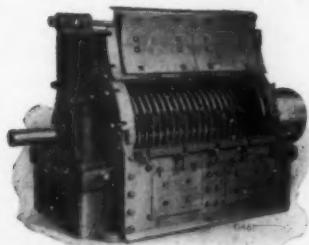


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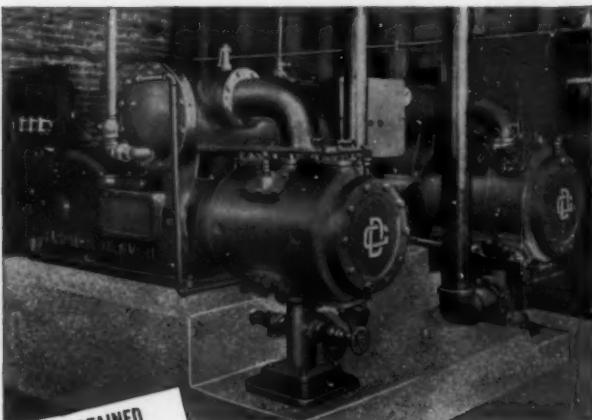
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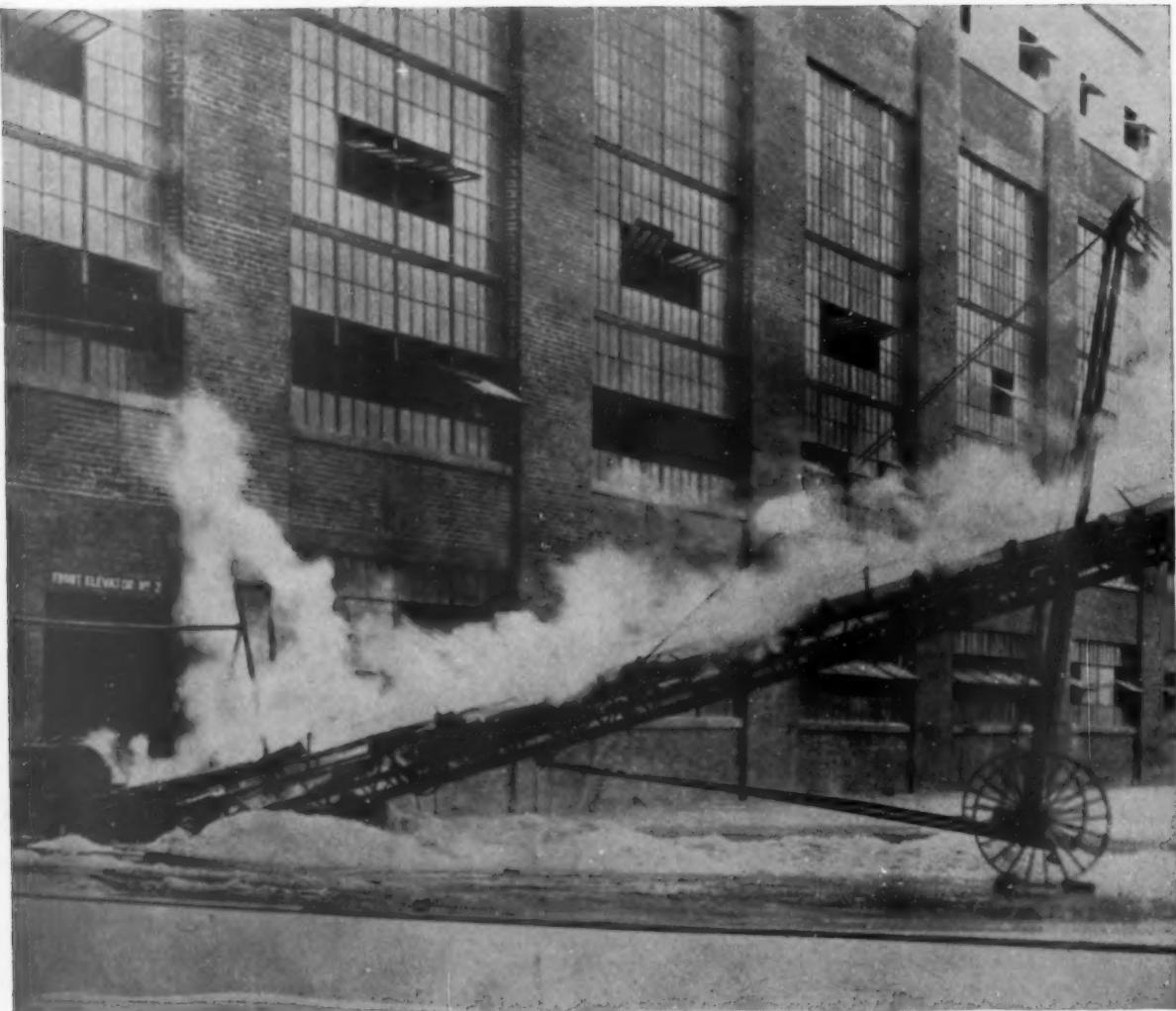
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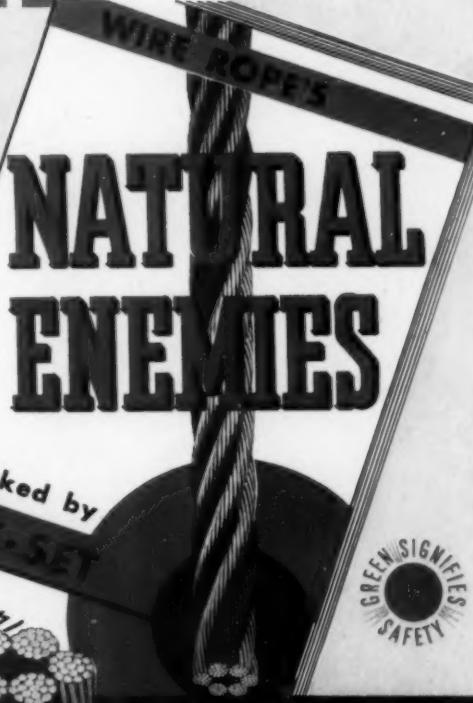
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